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[Founded in 1849 as the "Journal of Gas Lighting."]

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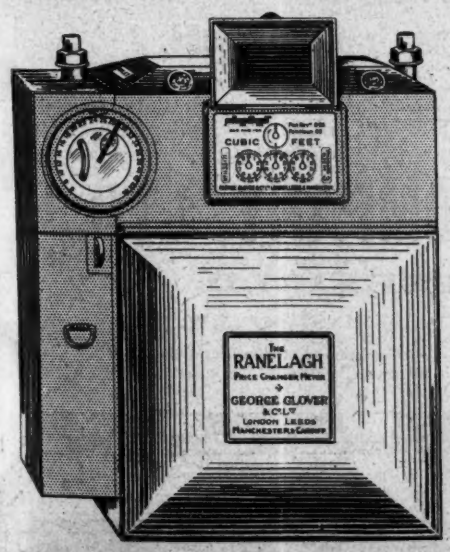

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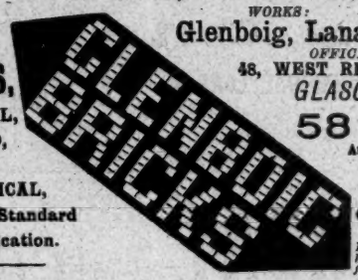

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VOL. CLVIII., No. 3076.] WEDNESDAY, APRIL 26, 1922. [74TH YEAR.

EDITORIAL NOTES.

Responsibility of the Therm Price.

NEVER was there greater necessity than to-day to consider the question of reducing the price of gas as much as possible, and to act promptly with every opportunity for doing so. This particularly applies to all companies working under the sliding-scale or on basic prices and basic dividends. In such cases, the responsibility of the therm price is great; the responsibility of the administrators of gas undertakings can be described as possessing the same characteristic. Consumers of gas have suffered heavily through the unavoidable price of gas during and succeeding the war; and so have gas share and stock holders, in both the market value of their holdings and the dividends upon them. The price per therm, too, is an important agent in developing or retarding business, and in providing an effective stand against competition. Hence the responsibility upon therm prices, and upon the administrators who have to decide what those prices shall be. Where recessions of therm prices are unnecessarily delayed, there new business has a drag upon it, competition from the other side is facilitated, consumers have little incentive to augment their consumption, stock and share market values are denied the increase that the prospect of additional dividend should give them, and the capacity of the undertaking for raising new capital is limited by the fact, and more has to be paid for any capital that it is imperatively necessary to raise. "Great" therefore does not seem of sufficient weight to emphasize the responsibility of the therm price. With the reduction of the Bank rate, and the prospect of a development of trade, the public will be looking for the best and soundest of lucrative investments. Through the new statutory protection that gas has in basic prices and basic (or minimum) dividends, and in the means offered by the Gas Regulation Act for standard price revision where adequate cause for it can be shown, gas capital is regaining attraction, and will do so more and more if gas administrators are only politic. It is due to consumers, share and stock holders, and to the undertaking itself that just at this time when the bridge of difficulty has been crossed so far, a policy in which boldness, caution, and discernment are all mingled should be adopted. The times, the price of gas, the relatively low values of gas shares and stocks, all justly claim that the old-fashioned conservatism shall be firmly discarded, and that everything that is necessary, and is possible, shall be done with the view to provide relief for the consumers, restore to the proprietors their rights (as well as to employee co-partners where they exist), and promote the demand for gas.

In many cases the values of gas stocks are going up; and therm prices are going down. Progress in the latter is reflected by the progress in the former. The South Metropolitan Gas Company have given notice of a reduction of price, as from the reading of the meters at the end of the current quarter, from 11½d. to 10d. per therm. The Company's basic price is 11d., so that the recession by 1½d. per therm brings the charge 1d. below the basic rate. The Company's new declared value is 560 B.Th.U. Therefore, 1000 c.ft. is equal to 5·6 therms; and 5·6 therms multiplied by 1½d. equal 8·4d. per 1000 c.ft. The price of 1000 c.ft of 550 B.Th U. gas was (at 11½d. per therm) 5s. 3¾d.; the price of 1000 c.ft. of 560 B.Th.U. gas will be (at 10d. per therm) 4s. 8d., or a difference of 7¾d. per 1000 c.ft. But there will be more B.Th.U. in the 1000 c.ft. This is a big leap; but it will enable the Board, if profits subsequently allow, to divide between the proprietors and the employee co-partners a goodly sum having a definite relationship to the advantage that the consumers enjoy by the therm price being 1d. below the basic figure. By the way, the 10d. per therm is now the lowest charge in London and the suburbs. The Company have regained an enviable position, with Wimbledon and Hornsey on their heels. The 10d., however, is not by any means the price that can be regarded as anything like the goal to which the Company and other gas undertakings must aim. At 550 B.Th.U., the Company were before the war supplying at 4·75d. per therm, or at less than half the price per therm that they are now doing, but which in current circumstances is a low one. But in the case of every undertaking it is the pre-war price per therm that should be the present ideal, although we know that years may roll away before the reduced prices of materials, labour, and money, and new economy developments in plant and processes will allow its realization.

The Wandsworth, Wimbledon, and Epsom District Gas Company have also given notice of a reduction to 1s. per therm in Wandsworth, 1s. 1d. in Wimbledon, and 1s. 2·2d. in the Epsom district. The Gas Light and Coke Company reduced their price at Christmas to 1s. 1d. per therm, to which figure the Commercial Company also lowered their charge. Our pages during the past quarter have borne evidence that in many other directions there has been activity in reducing the price of gas, so far as circumstances would permit; but still there are signs of some reluctance in places to adopt a more energetic policy in this regard, though an examination of items in the accounts of some undertakings that are lagging behind suggests that something more might be done. We see, for instance, remarkably heavy charges for maintenance and repair of manufacturing and distribution plant. But coincidently with the wartime ravages upon the plant, there were the wartime ravages upon trading stability and progress which largely concentrated themselves in the price of gas. That price requires attention equally with the provision for plant replacement or renovation, or restoration of reserves. Generally speaking, however, the earnest of good intention to reduce prices as quickly as possible is creditable. The coal strike last year and the costs it involved were, of course, a great set-back to the best of aspirations. It caused increases of the price of gas, combined with the anterior heavy fall in the market values of secondary products. But there comes a time when the extra charge for gas has liquidated the additional costs that the strike occasioned; and there is the accumulation of price increases during the previous seven years to be tackled. In the case of the South Metropolitan Company, the coal strike brought upon them an additional expenditure of £350,000, the recouping of which the Board decided to spread over twelve months by increasing the charges to consumers by 1d. per therm. In making the present reduction of 1½d. per therm as from midsummer, the Company are therefore more than keeping faith with their consumers. They have commenced to attack the price that ruled before the coal strike. They have done this with April well advanced, so that manifestly they have good grounds for the step they have taken. We look forward to a fairly general movement in therm price reductions at the end of June, as the hope does not subside in official gas circles that something more will be realized off coal prices and transport rates. With the prospect of an improvement in trade, too, secondary products should stand in better case; but, of course, in this respect, there is something problematical until there is rather more composure in the labour world, and until there is full recognition of the fact that capital and labour must work together if both are

to find lucrative employment, and this the one cannot do without the other.

There is the point as to the relation of price to competition. Coal is coming down further in price. Of this there can be little doubt. Production is improving; and there is steadier and more even working at the collieries. With the cheaper coal gas will be in competition, and so it will be with electricity, which will also be placed in an improved trading position by the reduction of fuel costs, and more efficient generating plant. Charges for electricity have been reduced considerably the last six months; and it is obvious that, as soon as the remnant of the loss incurred by the coal strike has disappeared from the accounts, there will be still further price descension. We have to bear in mind, too, the efforts that are being made by electricity undertakings to make general the adoption of a system of charging for current which will allow the use of electricity at low prices for domestic purposes other than lighting without having to incur the cost of a duplicate system of wiring and meters to enable differential rates for varying purposes. A clause in the Electricity Supply Bill now before Parliament will, if passed, empower the Electricity Commissioners to consent to new tariff schemes—such as bi-part tariffs, which allow a lump sum on some agreed basis to be paid, with a low charge per unit for the current consumed. The managements of electricity undertakings have in this matter their eyes upon the domestic heating, cooking, and power loads. In London certain undertakings are altering their tariffs with the view to stimulate business in all directions. In one case it is stated the charge is to be "8d. per unit for the "first four units per 30 watts of connected demand in each "summer quarter, and for the first eight units per 30 watts "of connected demand in each winter quarter." For all units consumed in each quarter in excess of the above number, the charge will be 4d. per unit. We take it this includes lighting and every other use. But the point is that the electricity concerns are actively considering how best to get themselves on a better competitive basis, which will give them greater freedom. This is one of the elements of which gas administrators should not lose sight in considering the policy of price reductions.

The Cultivation of the Power Load.

Not long since—in the "Journal" for Dec. 14—we dealt with a paper that Mr. Edward Crowther had read before the Liverpool Engineering Society (Students' Section). It treated of the subject of town gas and the gas-engine; and, as we showed at the time, there was much useful point in it. To "The Gas Salesman" this month, Mr. Crowther contributes an article, headed "Gas Sales for Power." There is in this so much that is important not only to gas salesmen, but to the entire industry, that we think the influence of what is said will be enlarged and intensified by drawing attention to it in the "Journal," apart from the supplement. The contribution might be divided into two parts. There is a charge of neglect and indifference to this section of the potential gas business of the industry; there is philosophic advice as to the lines that should be pursued to develop the business. Between the neglect and the developing lines, there is a marked affinity; and if this had been recognized earlier, and a remedy applied to a condition of defect in the industry's business methods, there is good ground for the belief that "the weight of prejudice" (to quote Mr. Crowther's own words) in favour of less economical competitors would not have grown to its present undue proportions. That is the serious effect of the grave neglect. It has given strength to the competitors for the business, and has, with the good ground offered by cultivated bias to work upon, enabled them strongly to assail town gas for power purposes. Yet the business is well worth having; and the gas industry is properly advised to review its position in this respect, in view of the thermal and financial advantages that can be claimed for the gas-engine.

For the neglect that there has been, our contributor asks, is the salesman to blame? Reading between the lines of the article (which perhaps is a dangerous thing to do at times), one gathers that he thinks they are. So do we, but only in part. Why are they to blame? If there has been neglect by them of this business—and in places there must have been—it has been largely because they are not qualified to deal with it. Mr. Crowther does not allege that the charge is fairly a universal one. If there are salesmen who are not qualified to deal with this business, then a good share of the responsibility for the state of things should attach to the responsible officials of gas undertakings. They should have seen that qualification exists where it is necessary for negotiating this business in a successful manner; and if there has been neglect by them in this regard, then remedial measures should be taken without further loss of time. The deficiency has been in technical qualification—that qualification which is necessary for advisory purposes, and to combat justly the claims (which are sometimes much exaggerated) of competitors. Our contributor places his finger upon the weakness when he says that some salesmen know too little of the costs of installation, running, and repairs to be able to push sales, and too little of the actual operation of the gas-engine, to be able to advise wisely in cases where trouble has been experienced. Because they know so little of the subject, there is the suggestion that they may be rather afraid of it, and therefore anxious to let it alone.

The whole matter of cultivation of the power load wants to be dealt with systematically; and, first of all, the men actually dealing with the business should be educated into line with requirement for the work. Then there are the business-getting modes of procedure by those men. It is plain that Mr. Crowther has made a studied investigation into this side of the question. A great thing is in all new premises in which power will be needed to get the responsible person interested in town gas before he has decided from insufficient data upon any other form of power. So much is heard of electric power and so little of gas power, through the different ways in which the two industries handle the subject, that the disposition of the prospective power user is to make inquiries regarding electricity, and to omit investigation into the merits of modern gas-engines operating on town gas. This shows the advisability of securing early touch with possible customers for power. The salesman should have some condensed data as to running costs ready for supply on the spot. In the "Facts and Figures" article in the March issue of the supplement, some examples were furnished, calculated on the therm basis; and these examples can be developed to harmonize with local conditions. All the better will it be if, with the help of the client, an estimate can be made of both the maximum and the average power requirements, as then an approximate figure can be computed for annual costs. There are one or two pitfalls in this connection, which Mr. Crowther warns the salesman to avoid. For instance, a gas-engine will not carry a heavy overload; and it is a fatal mistake to allow an engine to be fixed suitable for the average load, but incapable of carrying the maximum load. This is false economy. A sage piece of advice is that gas undertakings should cultivate good relationships with the gas-engine manufacturers. It would also be as well if the makers of gas-engines would do their part in cultivating closer relationships with gas undertakings; and those of them who have not already done so should learn more as to the gas and therm developments of the industry, and work accordingly. It is to the mutual advantage of the makers and gas undertakings that they should work together, and never more so than in times when gas developments have such a distinct inclination to lower-grade gas with sale on the therm basis. There is much that the makers can do in advising as to sizes of engines, location and foundations, and installation and maintenance costs under given conditions of working. Mr. Crowther is of opinion that in industrial areas the mutual operation of the two parties interested would quickly show reward in additional sales.

An important matter for the manufacturer in relation to power is reliability. One recalls, directly the matter of reliability is referred to in relation to power, the number of times on which industrial establishments have been stopped, output delayed, and many workers thrown out of employment through breakdown of the supply of electrical energy from town cables. All unnecessary stoppages, of course, may easily outweigh, from the monetary point of view, any claimed advantages. The manufacturer therefore sees much importance in the question of reliability—reliability of the machine, and reliability of the agent used for driving it. Under this head, the gas-engine is credited with less reliability than is its due, though, with systematic attention at almost negligible cost, it can be maintained in a condition of reliability and perfect running that will match any other source of power. There is information by Mr. Crowther in this connection of which note should be made. It shows that the cost of prudent attention to a gas-engine will not affect

materially the advantage margin between its costs and those of its closest competitor. Moreover, in respect of repairs, rectification in the case of the gas-engine is mostly a modest matter; while in the case of an electric-motor, the internal troubles and the rewinding that a breakdown probably involves are expensive matters. Mr. Crowther advises that data as to maintenance and other costs should be obtained from friendly manufacturers who can be prevailed upon to keep exact records. These would be very useful; and if gas-works would do the same in respect of their own gas-engines, there would be confirmation of a very valuable order under a variety of conditions of running. In dealing with these and other matters, there should be scrupulous fairness. In competition for business, merits are often exaggerated; the other side is frequently obfuscated as much as possible. Then, when there is success in obtaining a new installation, close observation should be kept upon it at the outset, and subsequently a periodical interest in order to effect readjustments, and to give advice as to maintenance. One other point, where a manufacturer has a predilection for electric power, there is no need for despair on the part of the gas salesman. Dynamos coupled to gas-engines can generate current at a cost which can nearly always beat the town electrical service, if the supply undertaking has regard to a fair commercial profit. Insufficient use is made of this fact; and it might be largely developed. The article by Mr. Crowther should certainly energize business-getting effort in the power line.

Position and Remuneration of Gas Chemists.

We have been talking long and much as to the future of the chemist in the operations of the gas industry. It has been recognized that the industry, owing to the character of its processes, cannot do without the chemist, if it wishes to work economically and efficiently, and to register further progress. An original error of the industry (due solely to its parentage) was that it was started, run, and solely developed on engineering lines; and, excepting in a few works, the chemist, until a comparatively few years ago, had small place and part in its operations. Things have much changed in the more important concerns. The value of the chemist in the control of purchases of raw materials and the sales of tar, liquor, and spent oxide, in the maintenance of efficiency in processes, in experimental work, and in developments generally is recognized, and the assessment of that value finds fair expression in remuneration. But there are other works where the engineers, though fully impressed with the importance of the work of the chemist, look upon him with somewhat suspicious and jealous eyes, and use their position and influence to keep him in what they regard as his proper niche. This is another mistake that has grown out of the error that arose through the accident of the birth of the industry, and the belated appreciation of the large chemical basis of the products of coal carbonization, and of the importance to efficiency of full chemical control. But that attitude must be altered. The engineer in most gas-works will always be the chief and responsible officer; but headship and responsibility need not be in a single iota affected by giving to the chemist the position and the remuneration to which his training and qualifications entitle him.

To this question the Council of the Institute of Chemistry, through their Registrar and Secretary (Mr. Richard B. Pilcher), direct attention in our "Correspondence" columns to-day. The opportunity for doing this has been afforded by the General Council of the National Association of Technical Gas Officials, owing to their classification of "chief "chemists" with chief draughtsmen and outdoor superintendents; and, through this, they are only awarded in the scale of payment 40 p.ct. of the remuneration of the chief technical officer. They are, in fact, placed in the fourth and last group of technical officers, and are (on paper) salaried accordingly. The scale is published in the letter by Mr. R. G. Shadbolt which appeared in our issue for Jan. 25. In including "chief chemists" in the fourth category, it must be admitted that the General Council of the "N.A.T.G.O." made an egregious mistake, and one which the Council of the Institute of Chemistry could not allow to pass without protest. We are sorry that this has occurred, after all the professions of the gas industry regarding the desirability of a greater incorporation in its work of chemists scientifically trained. Men so trained and so valuable to the industry must be given a commensurate status and remuneration, and not be merely accorded a place in the lowest class of technical gas officials. The Council of the "N.A.T.G.O." certainly failed in this instance to make adequate assessment and allocation.

This has moved the Council of the Institute of Chemistry to point out that the efforts of the Council of the "N.A.T.G.O." are likely to do more harm than good "in view of their attitude "towards the scientific men on whose science the industry "mainly depends, the lack of recognition of whose import-"ance is without doubt the weak spot of the industry." The statement is emphatically put. Up to a point it is true; but it is not wholly so. It is written from the single standpoint of the Council of the Institute of Chemistry, and perhaps on insufficient information. The Council apparently have little knowledge of the history of the "N.A.T.G.O." The organization was originally started to improve the status and remuneration of the ill-paid engineers and managers of far too many of the smaller sized gas undertakings; and while it adopted the style of the "National" Association of Technical Gas Officials, it has never been "National" in its representation and support. We have tried to assist in securing that support for the express purpose of strengthening the position of the professional men in those quarters where additional strength is much needed. But, with few exceptions, those who are well-placed and adequately rewarded have refrained from joining in the movement. Had they not done so, and had they taken an active part in it, the error of which the Institute of Chemistry rightly complain would not, we feel confidence in saying, have been made. But it has been made; and the classification and proposed remuneration, bearing the imprimatur of a "National" Association, may have an undesirable influence upon niggards in administrative authority. Therefore, the Council of the Institute of Chemistry are justified in their protest. But they go further, and say: "In the view of the Institute, such "chemists should be regarded as the professional equals of "the engineers, although the administrative officer, whether "engineer or chemist, should obviously be remunerated for "his additional responsibility." With the latter part of this statement all will agree; but it would be a big task to endeavour to obtain for the first part of the statement unanimous approval in the gas engineering profession, with its long-established official precedence. Therefore, we will not discuss it. At the same time, there are gas engineers of high rank who would be prepared to endorse it.

The Man Wanted on the Sales Side.

Attention should be given to a letter which appears in "The Gas Salesman" to-day from Prof. John W. Cobb, on the important subject of the man wanted on the gas sales side of the industry. It shows the extent of our correspondent's interest in the affairs of the industry when we find that articles and expressions of opinion that have appeared in "The Gas Salesman" have not missed his consideration. He detects a growth of the feeling that a more highly trained type of man is required in connection with trading in gas and gas appliances; and, in a dual capacity, he finds that the feeling has a good foundation of truth. As a citizen and a consumer of gas, evidence of the requirement has been brought to his notice, as it has been to most of us who are, like Prof. Cobb, capable of applying personal knowledge to the testing of the "information" given by some men who are employed as salesmen. When the occupier of the Livesey Chair, and thus the head of the Gas and Fuel Department at the Leeds University, and one of the joint authors of the classical report on gas and electricity efficiencies, corroborates, as a citizen, the existence of the need for highly trained gas salesmen, then it is time to pause and to consider the remedy. And the only remedy is, where there is not as the responsible chief of the sales department of a substantial gas undertaking a scientifically and technically trained man, to see that the omission is rectified.

As seen by our correspondent, the position is that those who are concerned in the sale of gas and gas appliances are often required to answer questions and to give advice concerning them of a kind which needs a real understanding of the scientific principles involved in the utilization of gas, and a knowledge of what is the thermal and financial position of gas and gas apparatus as compared with rival methods of heating and lighting. The knowledge necessary goes even farther than that. There has to be discrimination as to the types and sizes of apparatus most appropriate for any particular purpose, together with the best method of installation, as otherwise both economy and efficiency in

service may suffer to the detriment of gas as the lighting or heating agent. The professional experience of our correspondent before accepting the Livesey Chair was largely on the industrial side; and he knows that, in industrial work, gas salesmen have often to discuss matters with men who are by no means ignorant of the issues involved. That is a consideration for the administrators of gas undertakings in industrial areas. They, at all events, will not feel any pride in the knowledge that other industries possess men who will be able to pass judgment on any lack of knowledge possessed by the emissaries of gas who are sent to them for the purposes of giving information and advice and securing business.

The more extended our consideration of this subject, the more we can agree with Prof. Cobb's conviction that every gas sales staff in a position to afford the assistance should have incorporated in it one or more scientifically and technically trained experts—thoroughly trained, in order to realize the maximum benefit from his or their services. Prof. Cobb, realizing the importance of this, soars higher in his view as to the standard of scientific and technical education of the sales expert than the writer of the article on "The Man Wanted" in the January number of "The Gas "Salesman;" and he does this because of his appreciation of the responsibility that attaches to the advisory position that the gas salesman holds. The capacity for advising must cover a multitude of types of appliances, uses, and conditions. There is nothing stereotyped about the work of the gas salesman. It is not routine work. Every case has to be the subject of individual consideration and judgment. Therefore, the standard of education and qualification must be in line with the standard of efficiency which the variable and multiform duties demand. Education alone will not make the salesman. There must be the instinct for the work, combined with the qualifications that scientific and technical education imparts. Of this Prof. Cobb is fully aware, as he indicates that some of the graduates in his department would, he is sure, not care for the work, while there are others who would prefer it, if the financial consideration were sufficiently inviting. His gas-engineering students have no difficulty in finding openings at present; but he has in view others. The near future, he says, will probably see many graduates in chemistry and general engineering looking for openings in which their training may be useful, some of whom will have the instinct for salesmanship, which their scientific training would supplement in a very valuable way. The ex-service men nearing the end of their courses at the University will probably provide a number of men of the right type. Of this note should be made by the responsible officers of gas undertakings who are on the look-out for reinforcing the ability on their sales staffs. And not only "sales." Prof. Cobb rightly insists that it is essential that scientific knowledge and expert advice should be extended with all possible thoroughness to installation and inspection in use. Therefore in connection with the sales of gas and gas appliances, and the multifarious uses of gas, the field for scientifically and technically trained men is a vast one.

One Hundred Therms from Vertical Retorts.

Mr. George Keillor will find from our "Correspondence" columns to-day that a suggestion he made in his North British Association paper is contested—that makes of 100 therms should not be accepted as constantly attainable in vertical retorts. Mr W. Everard Davies is the critic; and while he does not suggest that existing verticals can attain beyond 100 therms or thereabouts when perfectly designed and controlled, he points to "unimpeachable proof" that such plants can be designed to realize such yields. Mr. Davies concludes thus: "It is my personal conviction and knowledge that 100 therms of 480 to 500 B.Th.U. gas are quite realizable; and on this basis, of course, it follows that lower grades will benefit still further. But coal conservation by economy of the setting thermal losses now inevitable is a very important factor in the realization. And such fuel economy is nowadays in the interests of all concerned with coal."

Engineer-in-Chief and "Technical Adviser."

The Board of the Metropolitan Gas Company of Melbourne have added to the dignity of their chief executive officer, and recognized the extensive character of his functions, by appending to the title of Engineer-in-Chief the words "and Technical Adviser." As the Chairman (Sir John Grice) said at the half-yearly meeting of the shareholders, the ordinary work of the Chief Engineer of a Gas Company of the size of theirs always entails onerous and arduous duties. In addition to these, Mr. J. N. Reeson had accepted the full responsibility of organizing and executing all constructional work carried out in the Company's workshops. The past few years, too, had in every way been of an exceptionally trying nature. Large constructional work has also been under way. No. 3 unit of the Woodall-Duckham plant will be ready for next winter's work; and there is the probability that No. 4 unit will soon have to be taken in hand.

Saline Substances in Coal.

In a paper read before the Italian Gas and Water Association, M. Boehm discussed the question of the noxious effects of saline substances in coal used for carbonization. He examines the effects of such substances on coke-oven and retort walls, as well as in tar distillation plants. M. Boehm is himself the translator of the paper as it appears in our columns to-day. The subject has several years' standing in technical consideration in this country. Nevertheless, the marshalling in the paper of personal and other experiences and remedies will be both interesting and valuable.

Gas-Works and Unemployment Insurance.

It transpires that, as the result of an interview that Mr. D. Milne Watson, as Chairman of the Federation of Gas Employers, had with the Minister of Labour (Dr. Macnamara) early last month, the Ministry has now reversed the policy of refusing to grant certificates of exception to gas undertakings until the whole question had been considered by the Joint Industrial Council. They found that it was not proposed that the matter should be brought before the Council. Certificates of exception will therefore be granted where it appears that the conditions of employment of the employed persons covered by the application are such as to satisfy the requirements of the Acts. One large undertaking in London has since received its certificate.

Rough Retorting in Situ.

The operations in connection with Norfolk shale have so far been disappointing to those who have invested money in the venture, over which at present a cloud of pessimism hangs, which a few optimists are trying to pierce with hopeful predictions. There has been a great deal of experimenting with the view of finding a suitable retort for shale, and again it is believed that the right design has been found. Looking over to Australia to see what is being done there, it is learned—this from the "Petroleum Times"—that the Commonwealth Oil Corporation of New South Wales have attempted a more direct way of obtaining oil from shale by a method in which a retort is dispensed with. Their plan is to fire the shale *in situ*, and thus convert the shale beds into a series of retorts. The sections treated are blocked-out and bricked-in; and sufficient air is supplied to maintain the desired rate of combustion. The air supply is under regulation, and therefore controls the burning of the shale. The early trials of the system appear to have met with success; and it is stated that oil was given off in abundance, as well as a large quantity of gas which is suitable for generating power. In the shale field controlled by the Corporation, the seams have a gradual dip; and it is proposed to fire the sections down the dip and not up. This, it is believed, will completely avoid all danger.

Engineering Dispute.

There has been no progress in arriving at an understanding in the engineering dispute, or at all events there had not been at the time of going to press, although efforts to that end have not been relinquished. But the position is very grave; and there is the prospect of some 600,000 members of 47 unions being, on May 1, added to the 250,000 members of the Amalgamated Engineering Union who have been locked-out for the last six weeks. In the dispute, the gas industry is not at present affected; and it is understood that no steps will be taken by the Unions to call out their members working for gas undertakings.

Coal Output.

Before the holidays, the coal output in Great Britain was showing a weekly improvement, which has no doubt been affected

by Easter time. But it expresses the existence of better willingness and effort, and perhaps also it is partially a reflection of the greater demand from abroad. In the first week in April, the total output was 4,961,200 tons, compared with 4,825,400 tons in the preceding week. We should like to see the weekly production well over 5 million tons. It has been there with fewer people working; and there is no reason why it should not get back to the old figures, and the old average per worker.

Gas Coal Exports.

The coal exports this year have been making remarkable flights, compared with the first three months of 1921 and 1920. Taking only gas coal, it is seen that last month 855,611 tons were shipped; the value being £936,517. The quantity shipped in March, 1921, was 348,626 tons; and in the same month of 1920, 176,450 tons. In the three months of this year, 1,875 466 tons of gas coal were shipped; in the corresponding period of last year, 850,768 tons; and in 1920, 635,268 tons.

Gas Coal Position.

From what is said in the preceding paragraph, it is almost superfluous to say that gas coal exporting fields are busy. This applies especially to Durham and Northumberland, where the position is very strong. Yorkshire, too, is enjoying a much more active inquiry. From other quarters it is reported that the demand for gas coal is not nearly so large, and that the inclination to spot buying continues to be very much the fashion. The engineering dispute is beginning to act as a set-off to the better export business.

Gas Coke Shipments.

Last month 75,791 tons of gas coke were sent abroad; the value (according to the Board of Trade returns) being £113,682, which averages approximately 30s. per ton. In March, 1921, 68,230 tons were exported, of a value of £153,515. In March, 1920, 56,904 tons were shipped; the value being £277,692. The gas coke exports in the first quarter this year were 226,068 tons; in 1921, 171,711 tons; in 1920, 217,577 tons.

Sulphate of Ammonia Exports.

These are still lagging behind last year's figures, which perhaps is more the evidence of an increased home demand than of a reduced inquiry from abroad. The quantity of sulphate of ammonia shipped in March was only 12,868 tons. It was nearly 6000 tons more in March, 1921. In the first three months of this year, 41,473 tons were sent abroad, compared with 52,313 tons in the corresponding period of 1921.

Nitrate of Soda Position.

It is stated that, owing to a shortage of synthetic nitrogen, a decline in the production of sulphate of ammonia, and a universal desire to increase the foodstuffs of the world, the demand for Chilian nitrate is improving, and consequently there has been a growing enthusiasm for nitrate shares. The shortage of synthetic nitrogen can only be a transient matter. Bye-product coke-ovens are now being rapidly put into commission again, or were until the shadows of the engineering disputes fell upon the country; and so from that source increased sulphate of ammonia production may be anticipated. The output from gas-works is now inclining to the summer level; but that is a normal condition. The circumstances that are favouring nitrate can therefore only be looked upon as temporary. Mr. Brodie James, writing on the subject of the intermittent state of crisis from which the nitrate industry seems unable to escape, says this would appear to be due to a tendency to disregard the first principles of economic law, which are that high prices check consumption, and low prices stimulate it. Mr. James would have the combination of producers dissolved; and with free competition the price would probably be determined by those who could produce the article at the cheapest rate, and in the end the result would be stability in an industry whose product undoubtedly fluctuates sharply.

Recent Wills.—Mr. Thomas Roper, who was Secretary of the Bromsgrove Gas Company, and who died last February, at the age of 69, left estate of the gross value of £3785. Mr. Cornelius Young, of Cambridge, one of the pioneers of the gas-stove industry, who had been associated for a number of years with Messrs. Fletcher, Russell, and Co., left £2555.

PERSONAL.

We learn that Mr. JAMES DOUGALL has resigned his position as London Manager to Messrs. Willey & Co., after fourteen years' service, and has opened the Chiswick Meter and Engineering Works, at 70, Strand-on-the-Green, Chiswick, W. 4. At these works he will carry on the manufacture of gas-meters, and undertake all kinds of meter repairs, in addition to the supply of gas plant and fittings of every kind.

At a social gathering held at the gas-works, Mr. JAMES DICKSON, Gas Engineer and Manager, at Kirkintilloch, was presented with a piano, upon the occasion of his approaching marriage. The inscription reads: "Presented to James Dickson, Esq., Gas Manager, Kirkintilloch, by the employees of the gas-works, Town Council officials, and commercial friends, upon the occasion of his marriage, April 26, 1922."

On the occasion of his leaving Whitchurch (Salop) to take up the position of Manager of the Deal and Walmer Gas-Works, Mr. J. F. TYNDALL'S services while occupying a similar position at Whitchurch were warmly eulogized by members of the Urban District Council. The Chairman (Mr. S. C. Rowland) referred specially to the invaluable aid rendered by Mr. Tyndall during the coal strike, without which, he said, the town would certainly have been in darkness.

The Milton Regis District Council, in recognition of the good results obtained in the Gas Department, have raised the salary of the Engineer and Manager, Mr. ARTHUR WELLS, by £50 per annum; and he is to receive 10 p.ct. additional on his salary in lieu of house, light, and firing when he gets married. Mr. Wells has been at Milton Regis about nine months. From March 31 the price of gas has been reduced 6d. per 1000 c.ft.

OBITUARY.

After an illness extending over several months, the death took place on Tuesday of last week, at his residence in Narberth Road, Tenby, of Mr. ALFRED HENRY BROOKMAN, Managing Director of the Tenby Gas Consumers' Company. Mr. Brookman left his native city of Bath nearly fifty years ago, and after holding positions at Merthyr Tydfil and Carmarthen he went to Tenby as Manager of a new company formed to take over the gas-works from the Corporation. Under his direction, the works grew from a small concern into one equipped with modern plant and appliances; and the Directors' appreciation of his good management and ability was shown by his appointment, in 1916, as Managing Director of the Company. He continued to give the Board the benefit of his advice up to within a few weeks of his death. His son, Mr. F. G. Brookman, is the present Manager of the works. During his long connection with the Company, Mr. Brookman (who was 71 years of age) always enjoyed the fullest confidence of the Directors; and they regard his death as a great personal loss. Mr. Brookman was also a Director of the Pembroke District Gas Company, and was, in fact, among the best-known men in the gas industry in South and West Wales and Monmouthshire. He was a Past President of the Wales and Monmouthshire District Institution of Gas Engineers (who met at Tenby during his year of office), and a member of the South Wales Regional Joint Council of the Gas Industry. He was a prominent Freemason. Deceased leaves a widow, three sons, and two daughters. The funeral took place last Friday, and was very largely attended. Among those present were the Chairman of the Company (Mr. H. T. Smyth), the Secretary (Mr. C. W. R. Stokes), and the Directors, together with Mr. L. W. Nuttall (Manager of the Pembroke District Gas Company).

The death took place on Sunday, after only a few hours' illness, of Mr. THOMAS HENRY HAZELL, the Secretary of the Newport (Mon.) Gas Company. Mr. Hazell, who was 68 years of age, was apparently in his usual health until 10 o'clock on Saturday evening, when he was suddenly seized with illness, and became unconscious. He did not rally, and passed away the following morning. A widower, he leaves three sons and three daughters. Entering the service of the Gas Company in 1872, Mr. Hazell won his way gradually to the position of Secretary, to which he was appointed in 1900. He had thus, at the time of his death, been with the Company for over fifty years. He will be greatly missed by the Wales and Monmouthshire District Institution of Gas Engineers and Managers, with whose proceedings he always closely associated himself. Mr. Hazell had been prominent in public affairs for many years, having been a member of the old School Board, a Governor of the Newport Intermediate Schools, President of the Newport Chamber of Commerce (in a discussion at which he took part on the Friday night preceding his death), President of the Newport Literary and Scientific Society, President of the Newport Philharmonic Society, and one of the promoters of the Newport Volunteer Training Corps, which afterwards became the Monmouthshire Regiment. He was a Fellow of the Chartered Institute of Secretaries.

On the 18th inst., the death occurred, at the early age of 42, of Mr. FRANCIS BARRETT, the Manager of the Ramsbottom Gas Company, in whose service he had been ever since he commenced work. For the past 21 years he had been Manager, in

which position he succeeded his father. He had a seizure a month ago, resulting in a stroke from which he never recovered. The funeral took place at Stubbins Cemetery, on Saturday, great respect being shown in the town, where deceased was very popular and much respected. The Manchester District Institution of Gas Engineers, of which Mr. Barrett had been a member for 21 years, were represented by Messrs. W. Whatmough (Heywood), J. Broughton (Haslingden), J. H. Davies (Oswaldtwistle), T. W. Smith (Whitworth Vale), and W. Rogerson (Middleton).

The death has taken place of Alderman Edward Davies, J.P., one of the principal public men of Llanidloes, and well-known throughout Montgomeryshire. He was in his 84th year, and in 1862 he became Secretary to the Llanidloes Gas Company.

AN INDEFINITE BURNER PROSPECTUS.

More Information Wanted.

A correspondent has forwarded to us a typewritten prospectus, which is marked "Private and Confidential" and "Not for Publication." We do not intend to publish the prospectus; and a document that has been circulated to several persons for the purpose of raising capital can hardly be described as "Private and Confidential." The correspondent invites our comments upon the prospectus.

The title of the Company is Jones, Hast, and Co., Ltd.; and it has been formed for the purposes of acquiring all the rights and property in the Howellite gas-burners, and to develop their application. Respecting the Howellite burner, we are not going to say anything except as to the general claims and the omissions. The prospectus does not say anything definite as to the performance of the burners, whether of the type used for lighting or for heating, cooking, or industrial purposes. There are no figures as to efficiencies which can be put to the test; but the statements are quite of a general character as to the burners being economical. As a light-giving agent we believe the burner is quite good; but the prospectus only says in respect of performance that the light is "steady." For cooking, heating, stoves, and burners, the patents are described as "valuable." Something more positive in the way of information (we hope this will be given) is wanted to test value, inasmuch as investors as a rule, if qualified to judge on these matters, do not care to rely exclusively upon the *ipse dixit* of promoters. There is one little statement which is somewhat more definite. It informs us that—

> For the outlay of a few shillings, an attachment can be made to fit in any heating or cooking stove; and this will show a saving of 30 to 40 p.ct. on their [*sic*] gas bills.

Let us assume a gas-fire showing a radiant efficiency of about 50 p.ct., and with the flue gases indicating that the heat passing away by the chimney is only 20 to 25 p.ct., so that there is at least 25 p.ct. of convected heat to add to that in the radiant form. Where in such a case is the saving of 30 to 40 p.ct. on the gas bill to come from? We should like to know, just for satisfaction.

The prospectus is rich in hope and promise. It may be all right. We cannot tell. The information as to what has been done is meagre. The inference is that the burners and business have not so far had a fair chance, apparently because of the want of the necessary funds, which it is now hoped will be provided, for exploiting the patents and developing the business. It is obviously hoped that the present prospectus will provide adequate finance. Among the developments:

> The Directors are making arrangements to apply their patents to large atmospheric burners, suitable for use by the large steel and smelting firms; and in this connection the demand is assured to fill a long-felt want, which is daily becoming a necessity. . . . The experiments which have been conducted more than justify the opinion of the Directors, and at the present time several of the most important steel and smelting companies are waiting to give the burner a trial.

But how can investors share the assurance felt by the Directors on the strength of such general statements? How can they on such statements participate in the confidence that is reflected in the unsupported assertion that "the revenue from this department alone will be very considerable, and sufficient to pay more than the dividends upon the whole of the capital?" The makers of other industrial burners will probably question the possibility of demonstrating the accuracy of this statement:

> It is important to remember that, whether trade is slack or booming, manufacturers and business firms are always prepared to save expense; and with this burner (which shows *at least* 30 p.ct. saving *over other burners*) this requirement is at once fulfilled.

As we have said, no information is given as to what business has been done, and what profits have been made. But we see the capital is £30,000, divided into 15,000 10 p.ct. cumulative participating preference shares of £1 each, and 15,000 ordinary shares of £1 each. The present issue is the 15,000 preference shares, of which 4000 have been applied for and paid for in cash. That £4000 reflects confidence. But the temptations to subscribe are really of too attractive an order. Ten per cent. for cumulative participating shares is great. To every subscriber of 100 preference shares ten fully-paid ordinary shares will be allotted, and *pro ratâ* for every 100 shares so subscribed for. Besides the 10 p.ct. on the preference shares, after the payment of 10 p.ct. to the ordinary shareholders, the preference holders will be entitled to one-third of the remaining net profit, after due provision is made for reserve and depreciation. As to assets, we see that the stock is valued at £2000, the patents have £10,000 put upon them, and the works plant, office furniture, &c., £1500—together £13,500, excluding goodwill.

We do not understand on what basis the prospective income has been computed; but here is the calculation:

100,000 Howellite burners, at a profit of 3s. each.	£15,000
1500 heating stoves, at a profit of £5 each	750
150 studio lamps, at a profit of £5 each	750
Glassware	1,000
Mantles	625
Sundries	500
	£18,625
Add estimated profits from furnace burners, &c.	4,000
	£22,625
Less Trade discounts, travellers, rent, advertising, administration charges, and general expenses	10,812
	£11,813
Income-tax at 6s. in the £	3,244
	£8,569

There is something wrong about 1500 heating stoves at a profit of £5 each only showing a total profit of £750. Anyway, from our knowledge of the prices of heating stoves and profits on them, we are wondering where a "profit" of £5 on each stove is coming from. The same as to a "profit" of £5 on each studio lamp. It seems to us that much more definite information is required than is given in this prospectus. That is the respect in which it is very deficient. However, judging from the figures, the Directors are hoping to do a very good business; but hope is not sufficient to attract capital.

BUILDING TRADES EXHIBITION.

Messrs. Burt, Boulton, and Haywood's Stand.

Messrs. Burt, Boulton, and Haywood, Ltd., the well-known timber merchants, sawyers, creosoters, and chemical manufacturers, have an interesting and comprehensive exhibit at the Building Trades Exhibition at Olympia, which was referred to in last week's "Journal," p. 148. They show samples of paving blocks cut from pitch pine, Oregon pine, and Baltic redwood, clean and creosoted, together with mouldings and pitch pine flooring and decking. They exhibit cable casings and samples of fencing, both creosoted and treated with their "Silvertown" wood preservative. They have an interesting exhibit in the shape of a section of a timber fence which was creosoted and erected by the Company in 1854, and which was removed on Feb. 21, 1922, in good condition. They also show specimens of telegraph arms as used by the G.P.O., and made of specially-imported Australian hardwood. The exhibit comprises mahogany, walnut, opepe, African teak, and other woods suitable for furniture and veneers, together with samples of Ekki (Lophira Frocera), as used for harbour piles and railway sleepers by the West African Governments. A remarkable series of photographs give evidence of the activities of the firm in this country and on the Continent, in Canada, Australia, Nigeria, and various parts of the world.

A complete model of a creosoting plant is exhibited, which shows the general arrangement and construction of a typical creosoting plant. It consists of the creosoting cylinder proper, and an upper container which holds creosote oil. The timber is run into the bottom cylinder on bogies, and the door closed. The creosote is then run into the cylinder, and forced into the wood under pressure by means of pressure pumps. The excess oil is taken from the wood by means of vacuum, and the timber withdrawn.

Messrs. Burt, Boulton, and Haywood exhibit specimens of their "Burtumen"—a specially prepared coal-tar product which is primarily an excellent road-making material. It has many of the properties of bitumen, and is exceedingly elastic. It does not lose this elasticity over a considerable period; and for this reason it makes an admirable waterproofing material for roofs, damp courses, gutters, and the like. Several specimen applications of "Burtumen" are exhibited, including waterproofed troughs, papers, felts, &c. It is quite insoluble in water; and no injurious tar acids are washed-out by rain. It will be readily appreciated that this is important in the case of roads in the neighbourhood of streams or lakes containing fish. The exhibit shows a gold-fish swimming in a jar, the bottom of which is coated with "Burtumen," also an interesting assortment of disinfectants for the house and farm—including "Ialine" and "Ialine-Lysol," and other well-known products manufactured by the firm. Altogether the exhibit is a most comprehensive one, and gives ample evidence of the world-wide activities of this well-known firm.

INSIDE THE NEW ASTORIA GASHOLDER.

The Morris Oil Skimmer.

Communicated by Herbert W. Alrich, of New York.

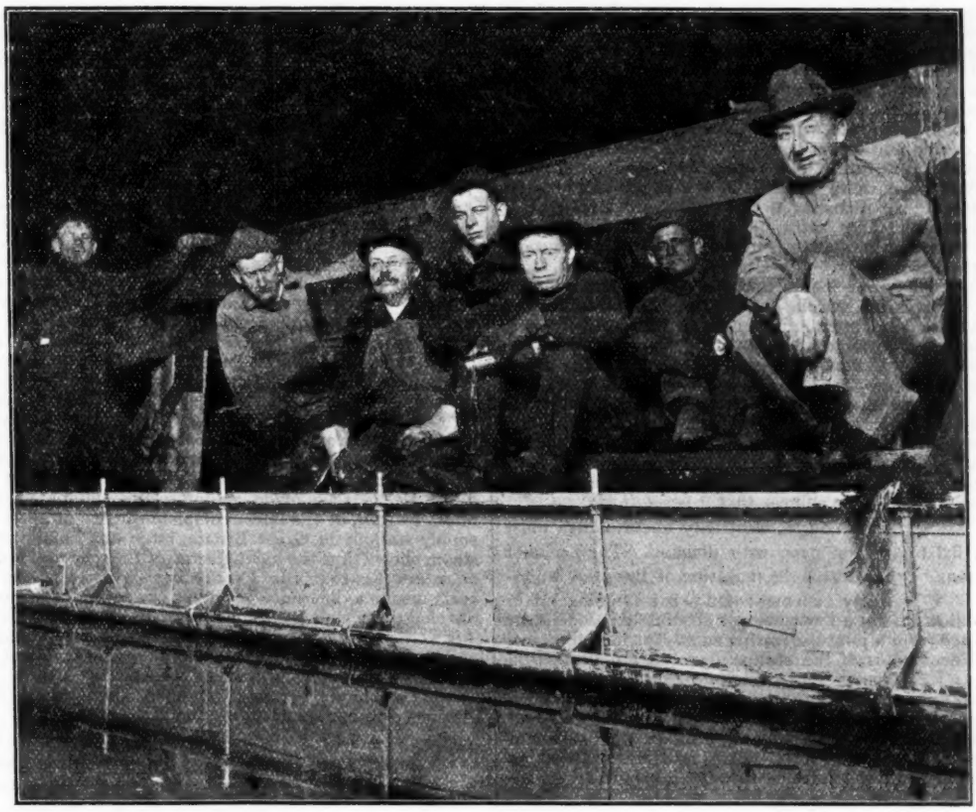
In the issue of the "Journal" for March 1 (p. 495), there was reproduced a picture taken on the occasion when gas was first turned into the second 15,000,000 c.ft. holder at the Astoria plant. I am sending another photograph, which was taken some days before; and it is my belief that this is the first and only photograph ever taken inside an inflated gasholder.

Before placing a holder in commission, it is our practice to make a thorough examination of the interior; and the group shown in the picture were engaged in the work of inspection at the time the photograph was taken. The writer is near the centre, holding an electric lamp and having both feet on the dam-plate. The man to his right is Mr. Hubert Krekel, the holder designer of the Bartlett Hayward Company, the contractors.

The picture shows the timber work of the crown support, and also the Morris oil skimmer, with which most of the large gasholders built in the United States during the last ten years have been equipped. This device was invented by Mr. W. Cullen Morris, the Assistant Chief Engineer of the Consolidated Gas Company.

The oil skimmer consists of a ring of steel plate about three feet wide, set vertically and submerged for half its depth in the tank water. This plate forms a ring just outside the timber frame of the crown support, and is carried by brackets attached thereto. The surface of the tank water interior to the bell of the holder is thus separated by the plate or dam into two parts—the circular area interior to the ring or dam, and the annular area exterior thereto. Attached to the outer face of the dam is a trough or gutter suspended by adjustable hangers. The trough is connected by pipe lines to a steam pump located outside the holder, which pass downward to the bottom of the tank, along the tank bottom, and up the inner face of the tank wall to the coping, and thence to the pump. Near the centre of the tank there is a funnel, which is also connected by a pipe line to the steam pump. The upper edge of this funnel is just below the surface of the tank water. By means of this equipment the light oils which accumulate on the interior surface of the tank water can be skimmed from the outer annulus, pumped back through the funnel, and stored within the dam-plate. When desired, the accumulated oil can be withdrawn from the holder by the operation of pumping on the funnel line.

The photograph shows the skimmer gutter some three inches above the surface of the tank water. This is due to the circumstance that at the time the photograph was made the full quantity of water had not been placed in the tank.



INSIDE THE FIFTEEN MILLION CUBIC FEET ASTORIA GASHOLDER.

ELECTRICITY SUPPLY MEMORANDA.

The Government are showing some anxiety to hurry through the Electricity Supply Bill by which they hope to secure the financing of the joint electricity supply authorities. Meantime, electrical experts continue to assail the whole scheme of joint electricity authorities and the proposed method of their financing.

The Great Mistake.

We saw this in Mr. A. Hugh Seabrook's paper just recently, where he showed that thermally, and from the points of view of technical and financial economy, the super-station projects are a mistake. Mr. Arthur Wright was lately attacking the schemes from the financial aspect; and Mr. J. S. Highfield has been criticizing the plan of joint authorities and most other features as something tantamount to retrograde. These are all "heavy-weights" in the electrical world; but the Government—inspired by crude reports rather than the deliberate views of eminent men after long consideration of those reports—are urging the schemes forward, because these are about the only things that remain out of the wreckage of the attempts to create of this country a place of celestial bliss. They have found that the blessed word "reconstruction" has a meaning that cannot ignore reasonable evolution; but they are forcing forward something that despises evolution and aspires to revolution. Mr. Highfield is the latest critic; and it is clear that he does not think much of the new joint authority schemes. He asserts boldly that the original framers of the Bill [the one resulting in the principal Act] did not give due weight to the value of existing electrical properties or to the rights of those in whose interests they proposed to legislate. They dwelt on theories and neglected practices. And then another barbed charge: "Fortunately the House of Lords came to the rescue, and prevented the Government carrying out a scheme which would certainly have failed, and would have been more costly and wasteful than the Government housing scheme." What obviously Mr. Highfield had in mind were the District Boards, their compulsory powers, the wholesale sacrifice of what had been done, and the starting afresh (so to speak) in the work of electrical development. Instead of speeding-up progress, this would have retarded it. It would have forced the industry back to first principles. All that had been done would have had to be undone, and the industry would have had painfully to retrace its steps, and begin all over again. Of course, with a statutory industry, there must be legislation; there must be a certain amount of control. But the gas industry knows full-well how,

until it obtained the Gas Regulation Act, political conception of its needs had always travelled in the direction of limitation, and the creation of blind alleys. Of the same thing the electricity industry complains; and apparently in Mr. Highfield's judgment, the original Electricity Supply Bill was for the industry the capping-stone to this type of legislation. Anyway, the Bill was, and so we may take it the Act is, a superfluity.

Superior Place of the Power Companies.

The Act proposes to set-up machinery for the supply of cheap and abundant electricity; while already ample provision for such supply is in being. In all the important industrial areas in the country, a power company is in existence, which, by co-operation with the existing municipal or company undertakings, could perfectly well provide all the electricity required. The Electricity Boards were, under the original Bill, to acquire all the generating stations and all the works of the power companies and the distributing authorities. In other words, they were to do the work all over again. In their places, joint electricity authorities were set-up. Mr. Highfield cannot see that these bodies can be of any service unless they are able to raise money; and if they are given power to raise money, they become merely district electricity boards shorn of some compulsory powers. He is conservative in these matters. He likes to see steady evolution. He is no believer in the scheme of setting-up a vast new authority where adequate provision already exists. He has seen many instances where the transfer of great undertakings to new authorities has resulted in loss to all parties concerned, and has usually issued in higher prices to the consumer. In the areas of the power companies, he cannot detect any reason whatsoever for setting-up joint authorities. If a joint authority is allowed to raise money and erect works, it will simply duplicate to some extent the work of the company with a resulting waste of capital and higher costs. In areas where there is no power company, an operating joint authority might be useful, but widely distributed electricity supply is in Mr. Highfield's view far more likely to succeed if managed by a compact board working on proper commercial lines, rather than by a large mixed public body whose members are directly responsible neither to ratepayers nor to shareholders. Mr. Highfield suggests that those who require electric power should become shareholders in power companies. He sees no reason, too, why municipal authorities should not acquire debentures in power companies, provided they are well secured. The money raised would probably be less in amount than they would have to raise for their own plant. However, he is not at all sure that local authorities should be allowed to invest in ordinary shares. This is about the only point on which we are at variance with Mr. Highfield. On our part, there is strong aversion to local authorities who have to borrow money becoming lenders of money—lenders of borrowed money. This is bad finance; and we think that, if Mr. Highfield ponders over it from this point of view, he will see that it is so.

Reinforcing Existing Conditions.

Of course, electricity undertakings must keep pace with demand. They cannot wait for the maturing of the joint authority schemes; and what is going on in many cases will make not a few concerns absolutely independent of any assistance from a joint generating supply for long to come. The doubtful economies at the station (ignored are the set-off higher charges for transmission) constitute the reason for the joint generating schemes; and those vague economies are being discounted by the energy that is being shown in extending and replacing existing plant by something more modern. There can be no scrapping of this; and it all means, at any rate for some years, less business for the joint electricity authorities. Where there is sufficient provision from fairly modern plant, there is no need for supply from a joint generating plant which may not (who can tell?) be able to supply at a rate cheaper than the local plant—this being free from long transmission expenses and from much new plant and buildings of a fairly expensive character. Week after week, the news items in the electricity papers give information as to sanctions by the Electricity Commissioners to loans of many thousands of pounds or only a few, for the extension of existing plants or for renewal work, and information as to schemes for which loan applications are about to be made. All this means reinforcing existing conditions to the detriment of the joint schemes. But then it may be argued that it will take some years to bring about generating reorganization and concentration. True; and that work, as it involves new expenditure and a cancelling and liquidation of much old expenditure, means cost on the high scale, and charges that will only have one source of supply to meet them—and that source the consumers of electricity. As time passes, interest in the electricity reorganization schemes wanes more and more. And who can wonder, when there is so much ambiguity surrounding them, and when there is so much creditable authority on these matters opposed to the methods of the Government for providing (as they think) for the regeneration of the industry, but, as Mr. Highfield and others opine, for serving the end of retardation through uneconomy?

Electric Plant Makers and the Future.

From what has been said in the preceding paragraph, it would seem there should be fairly good ground for electric plant manufacturers being in cheerful spirits. On top of local extensions should come the super-station work, providing the Government programme does not meet with a mishap; but the probability is that the super-station work will not be spread through the electric plant manufacturing industry in the same way that work is with smaller local stations entering the market for new plant. At the recent meeting of the Brush Electrical Engineering Company, the Chairman (Mr. Emile Garcke) said the balance-sheet was the best one the Company had had since its reconstruction thirty-four years ago. He went farther, and indicated that, having regard to the prevailing depression in most industries, the prospects for the immediate future are good. Another sign of the renewal and extension times is that there is, he says, a pressure for the early delivery of plant; and the Company have lost contracts through their inability to meet this requirement. However, with the revival of business, the Company, with a good amount of work in hand, are hoping to get their order book re-packed for the future. There may, however, be an undue amount of optimism in all this, as "Meteor" of the "Electrical Times" asserts that "contracts to-day are scarce, and can only be secured as a rule by price-cutting of a drastic character." He is not therefore so hopeful as the Brush Chairman was when addressing the shareholders; and our journalistic friend accentuates his feelings when he says that "even if last year's turnovers can be approached or equalled, the ratio of profit is likely to show a marked decrease where profits are shown at all."

Low Generating Costs.

Generating costs only represent (say) 25 to 30 p.ct. of the total costs of an electricity concern. Capital charges are the predominant partner in the expenses per unit of output. This should never be forgotten when reading of notable generating performances, though these, of course, mean economy. But a given percentage economy in capital charges may mean much more than a like percentage economy in fuel charges. However, Mr. Garcke was a little profuse in his praises of the saving quality of the Brush Ljungstrom turbo-generator plant; and up to a point he gave some reason for this, though other makers will perhaps question whether the turbo-generator with the peculiar name has any merits in excess of other modern types of turbine plant. However, Mr. Garcke says that evidence of economy in steam consumption continues to accumulate. There is the Loughborough Corporation electricity station, which is equipped throughout with turbine plant of the Brush production, though some of it ante-dates the Brush Ljungstrom type. According to a report by the Electricity Commissioners, this station occupies for low working costs the third most favourable place in a group of 114 electric undertakings in Great Britain. At Hereford, where there are two 1500 KW. Brush Ljungstrom sets, the coal costs in 1921 were only 0·47d. per unit; but it ought to be mentioned that, combined with the efficiency of the turbines, this station enjoys a cheap fuel supply. Then Mr. Garcke made an interesting computation. Examination, he said, of the latest complete returns of all the electricity supply stations in Great Britain, large and small, generating by steam shows that the average cost of fuel per unit sold is 0·935d., or rather less than 1d. On this basis every 0·1d. per unit in fuel costs means a difference of £1,000,000 in the coal consumption of the electricity supply stations of Great Britain. In other words, if it were possible for all steam stations to generate as cheaply as at Hereford, there would be a total saving of about £5,000,000 sterling per annum. But then all stations cannot get fuel as cheaply as Hereford; and all stations cannot afford to scrap their turbines or other steam-using plant.

Government Guarantees.

A White Paper has recently been issued showing the guarantees the Treasury have stated their willingness to give under the Trades Facilities Act, 1921. The total sum included in the guarantees is £14,958,145. It is spread over fourteen undertakings, and in each case the guarantee is for principal and interest. There are a few millions allocated to railway electrification work; and there are three electric supply companies in the list. The Calcutta Electric Supply Corporation, Ltd., have £500,000; the Minehead Electric Supply Company, Ltd., £4500; and the Kent Electric Supply Company, Ltd., £15,600.

Trade Union Tyranny.

The Electrical Trades Union are incorrigible. Once more they have refused to allow members to connect up an electricity service cable, where the interior wiring has been done by non-unionists. This time the trouble is at Chelmsford. The matter was taken before the local Whitley Council; but as the Union refused to remove the veto, the Chelmsford Corporation Electricity Department have withdrawn from the Whitley Council, and the claim has been referred for discussion to the National Council. The London Secretary of the Union (Mr. W. J. Webb) says they have held up hundreds of jobs temporarily, until the workpeople concerned have joined the Union. He anticipates that this is what will happen at Chelmsford. Whether it will or not, this compulsory method of compelling men to join the Union is not in accord with the freedom of the subject. The issue has been before the National Industrial Council for the Industry. It is thought there are good hopes of a permanent settlement; and meantime a general truce has been called.

COLLECTING GAS SAMPLES.

"Das Gas- und Wasserfach" for April 8 describes two apparatus suggested by Dr. Schumacher, of Aix, for the collection of gas samples. The first of these (fig. 1), it is claimed, enables an average sample to be taken over a period of gas production lasting perhaps many hours. The collecting vessels A, and the larger vessel B in the middle, are connected by a tube R, and represent, therefore, communicating vessels filled with water. In B there is a float C, to the weighted guiding rod D of which is attached another rod E. Connected to the lower end of this is the outlet of F—a rubber tube branching from the tube R—through which water can be run off from A and B, while the gas to be collected is drawn into the two vessels A. The rate of flow of this water, and therefore the period during which the gas sample is to be collected, is regulated by a cock. By means of the connection between the float C and the end of the tube F, the difference in levels (H) is maintained constant throughout. This is of great advantage for the collection of an average sample, as the inflow of gas is thereby kept at a constant rate, provided that there is no very great variation in pressure at the source. This, of course, is one of the main difficulties in continuous sampling.

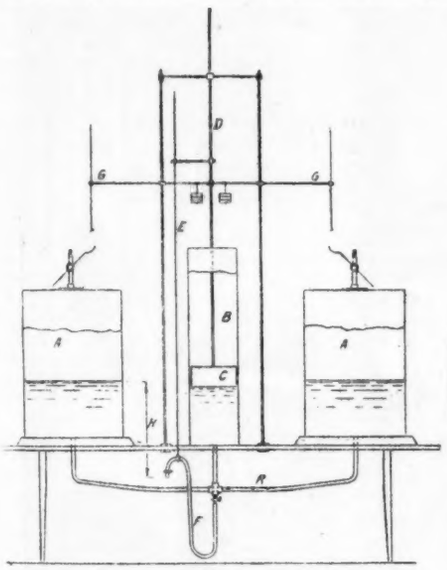


Fig. 1

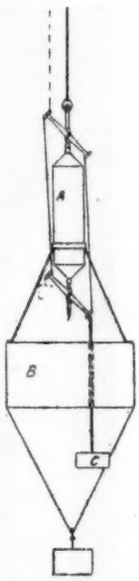


Fig. 2.

The second apparatus described (fig. 2) is suitable particularly for taking gas samples from wells or shafts, the whole being lowered into any narrow space at the end of a rope. It consists in the gas collector A, which is held by means of supports on the float B. A weight attached to the latter ensures the apparatus remaining always in an upright position. The two cocks of the vessel A are so connected that they always remain in the same position as one another. As the diagram shows, a rod passing through the float B, and provided at its lower end with a smaller float, is fixed to the lever of the lower cock. This smaller float, as soon as it touches the water, actuates the opening of the gas-cocks. The water, with which the vessel A has previously been filled, runs out, and gas takes its place. When the apparatus is raised again from the surface of the water, the float C closes the cocks by its own weight, and the gas is enclosed in the collecting vessel A.

Another method of working the cocks is to weight one side of the lever of the lower cock, and to attach the rope carrying the whole apparatus to the same side of the upper lever. When the float B touches the surface, the rope becomes slack, and the weight on the lever of the lower cock opens both. They are closed again when the apparatus is withdrawn. This construction is shown by the dotted lines; and, of course, the float C is not required.

"Domestic Gas Lighting" is the subject of No. 98 of "A Thousand-and-One Uses for Gas," published by the British Commercial Gas Association, who have wisely selected the spring-cleaning season for drawing attention to this important matter, inasmuch as if it is desired to improve the gas-lighting arrangements of the house, this time provides the best opportunity to have the alterations effected with a minimum of trouble.

North of England Gas Managers' Association.—Mr. F. C. Willis will preside over the annual general meeting of the Association, which is to be held in the gas offices, Grainger Street, Newcastle-on-Tyne, on Friday, May 5, at 2 o'clock. The following three papers will be presented: "Distribution Problems at Bridlington," by Mr. J. Kelly, of Bridlington; "The Preparation of Road Tar in Gas-Works," by Mr. S. A. Wikner, of Newcastle; and "Notes on the Use of Coke-Oven Gas for Town Supply at Middlesbrough," by Mr. C. F. Blincoe, of Middlesbrough.

SCOTTISH JUNIOR GAS ASSOCIATION.

(EASTERN DISTRICT.)

Annual Meeting.

There was a large attendance at the annual meeting of the Eastern District Section of the Scottish Junior Gas Association, which was held in Edinburgh on Saturday, the 15th inst.

The Report and Accounts.

The Hon. Secretary (Mr. R. L. Laing, of Brechin) submitted the annual report, which stated that there had been attendances at the meetings averaging 42. This was a pleasing feature; and the presence of honorary and senior members had given a stimulus to the juniors. They had enrolled six new members, three had been struck off the roll, two had resigned, and one hon. member had been elected; so that their total membership still stood at 100. With the balance carried forward from the previous year, the income totalled £65. The expenditure for the year had been £54, so that the amount at their credit was about £11.

The report was adopted.

New Officers.

The meeting then proceeded to the election of office-bearers. Mr. W. A. Dearden (Dunfermline), the Vice-President, automatically became President. Mr. D. D. Bruce (East Wemyss) was elected Vice-President; and Mr. R. L. Laing was re-elected Secretary and Treasurer. Messrs. W. Scott (Alloa), J. Scobie (Dunfermline), and J. T. Bathgate (Edinburgh) were appointed members of the Council. Messrs. John Davie and J. A. Anderson (Edinburgh) were re-appointed auditors.

Question of Affiliation.

Mr. J. Cubie (the President of the Western District Section), who represented both the Eastern and Western Districts at the conference held in Leeds in November last to consider the question of the affiliation of the Scottish and English Junior Associations, was present, and gave his report.

In the discussion which followed, Mr. Laing said he did not think they should have anything to do with affiliation. He pointed out the scattered character of their membership in the Eastern District, and the few educational facilities they had at their command, except in the larger towns. The result would be that it would be difficult for many of them to come up to the standard for membership, and their numbers would be reduced.

Mr. Cubie, replying to a vote of thanks for coming from Glasgow to submit the report, said the Western District thought it was not necessary for them to take part in the work of the English Juniors—they were doing pretty well by themselves.

Mr. J. Scott (Cowdenbeath) said that when they considered this question in 1904, they decided to have nothing to do with it; and he still thought they would do right by standing alone. He suggested that their own two Associations might reap greater advantage by having a joint meeting annually. They might have a fusion which would suit themselves and would counterbalance any loss through not being affiliated with the English Juniors.

Mr. Cubie said he believed they would all be of the same opinion as Mr. Scott. Besides their annual joint visit, they might have a joint meeting for the reading of papers; or they might go a little farther, and have their "Transactions" printed jointly. They might also arrange so that they should have a week-end meeting. The Eastern District were not so centralized as the Western; and the meeting place would require to be central, to get a fair turn-out of members. He would be glad to take back any suggestions that might be made.

Mr. Laing favoured the idea. A monthly or fortnightly meeting would not do. It might suit some members to go to Glasgow; but it would penalize those in Dundee or Forfar. They might cut-out the joint visit, and have two joint meetings.

Mr. W. A. Dearden (Dunfermline) preferred the holding of two joint meetings. They might not be so popular as the visit; but they could be more readily arranged.

Mr. Cubie stated further that they in the West were going to start a laboratory and workshop next winter, and have two meetings each week besides the monthly meetings.

On the motion of Mr. J. J. Scott, seconded by Mr. Dearden, it was agreed to ask the Western District to arrange for a Joint Council meeting to consider the matter.

Deposits in Steel Mains.

Mr. J. J. Scott (Cowdenbeath) was then asked to resume the discussion which was adjourned from a previous meeting after the reading of his paper on "Deposits in Steel Mains."* He said the more he considered the matter, the more he was impressed with the belief that cyanogen was not alone in the composition of the deposits found in steel pipes, but was only one element, and CO_2, ammonia, free oxygen, and moisture in the gas all took part in a complex chemical action against the constituents of the steel. This being so, he was convinced that any treatment must be conducted in the works, and not in the district. Presently, there were two forms of treatment being experimented with—the Helps system of compressing to a pressure of about 50 lbs. per sq. in. into a container at the works, cooling, and then distributing at lower pressures. This treatment brought down all the moisture, and with it some of the elements which had a direct bearing on

* See "Journal," Vol. CLVI., pp. 750, 821.

the corrosion. For further details of this he referred them to the report of the Life of Gas-Meters Joint Committee to the Institution of Gas Engineers of 1919. The other form of treatment was that of Taplay's chalk purification system; but detailed information as to this was not yet available. It was simple, and of great importance. A further scheme of treatment had been brought to his notice which seemed on the surface to deserve consideration. This was the freezing-out of all moisture in the gas, which would bring down with it some of the impurities that had an injurious effect on pipes and also meters. This freezing-out method was common practice in blast-furnace works, in extracting the moisture from the air in the plant. This air treatment increased the output of the furnace by 20 p.ct., and reduced the fuel consumption by 10 p.ct. The freezing plant dealt with 40,000 c.ft. of air per minute; and therefore it was quite possible to deal with the quantity of gas made in any gas-works. The question presented itself as to what would be (1) the effect on the composition and calorific value of gas so treated, (2) the proper position in the works to place the plant, and (3) the cost of the plant and of operating it.

Answering a number of questions, Mr. Scott said he found that the rust trouble took place in the high-pressure mains and the low-pressure steel services. He had no trouble with cast-iron pipes, except where the gas passed from the steel to the cast-iron ones. Temperature due to compression in the gas, he thought, should operate either way. If the gas was compressed, and the temperature acted, they would have this deposit in the pipes. It took place in the high-pressure main where it collected water and water and oil due to the change of temperature in the first two or three syphons; but he found practically no water in the remaining five or six miles. This indicated that the change of temperature had its effect on the moisture contained in the gas. It was beyond that point that the trouble began.

AN ALL-GAS HOUSE.

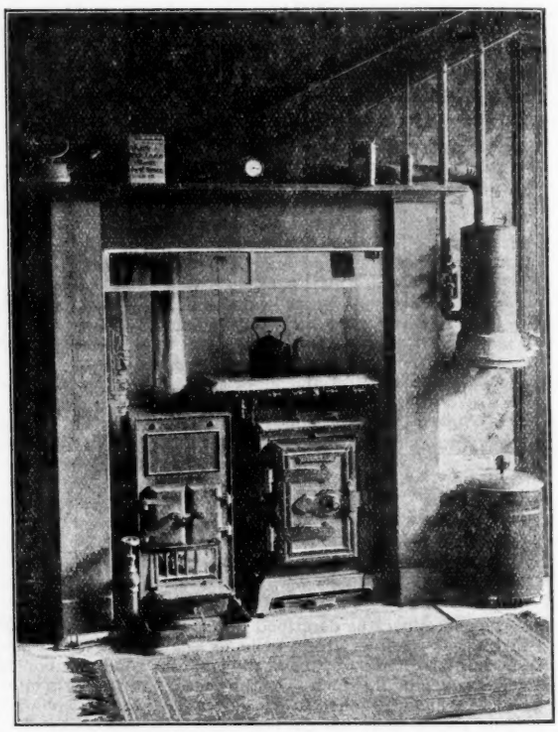
Mr. R. B. Chalmers (Falkirk) then delivered an address on "An All-Gas House." He began by stating that three years ago he conceived the idea of fitting-up the six-roomed house which he

Gas Interior, Fitted-in with Enamelled Sheet-Iron Surround.

occupied with gas for lighting, heating, and power to work labour-saving appliances. He proceeded to illustrate what he had to say by drawings on the blackboard, and photographs of interiors with fittings and appliances of various kinds, and by demonstrations.

In fitting-up this house, the main idea was to save as much labour as possible in running it. Gas, of course, was the only medium for heating and cooking worth having. The kitchen range was taken out, the lintel raised about a foot, and the recess lined with white enamelled sheet iron. A "New Main" gas-cooker with extended top was fitted, and also a coke-fired water-boiler. The first boiler was wholly enclosed for water heating only; but the kitchen was very cold for working in. This boiler was removed, and one with opening doors fitted, thereby heating the kitchen. It burns coke, coal, wood, and all household refuse. The circulating pipes which were coupled to the range were simply coupled to the boiler; and at the right-hand side a "Main" gas-circulator was fixed, as shown, to supply hot water in the summer. In winter the fire is on night and day, and an abundance of water at 180° Fahr. is available at any time. After flowing to the circulating tank, the hot water heats the towel rail in the bath-room, a six-tube radiator in the hall, and a three-tube radiator in the dining-room, and returns to the bottom of the boiler as shown. From the top of the recess hangs a hinged glazed frame about 6 in. deep, forming a canopy to pass the fumes from cooking operations up the chimney.

The dining-room is fitted with a "Byron" 18-in. gas interior. An enamelled sheet-steel surround the size of the grate opening, and fitting round the interior, is used instead of tiles. The advantage of this system is no messing with bricks and lime when fitting the fire, and only one tradesman on the job—the gas-fitter. The drawing-room fire is fitted with a plain sheet-steel surround, mounted with Lina Crusta paper. This, when enamelled, gives a most pleasing effect, and is cheap and easily fitted. This fireplace has an enamelled sheet-steel hearth fixed in a very simple way. A saw-cut between the floor and the wooden joints allows the hearth to slip in, and shows no joints. The bedroom fires are nine-fuel "Author" fires, one fitted with trivet boiling-burner. All the fires have "Carter" valves; these being more suitable than



The Assembled Equipment in the Kitchen.

the ordinary full-bore type, on account of the entire absence of whistling sound at the plug of the gas-tap.

The lighting of the house was more difficult to settle. The local gas supply varied somewhat, and the electricity supply varied a good deal. The author had a 1½ h.p. gas-engine in his small workshop at the back of the house, so he installed a 50-volt electric plant. This does very well, and supplies all the lighting and power for an electric washing machine, iron, and kettle. The cooling tank of the gas-engine is a ten-tube radiator on the half landing of the staircase; and the waste heat gives a nice warmth upstairs. The house is fitted-up with multiple switches—furnishing a very handy control of the lights.

The gas-engine drives the workshop with a turning-lathe, drilling machine, &c., and also a 1-in. rotary gas compressor, which is used as a vacuum pump. Inside the workshop is a sheet-iron receiver about 18 in. by 10 in. fitted with a cloth filtering bag, and from it a pipe runs to the hall, and a branch upstairs. To either of these two connections can be fixed a 30-ft. length of 1 in. flexible steel hose, which reaches all corners of the house. All the dust and dirt is delivered in the box in the workshop, and cleaning labour reduced to a minimum. This machine gives a good vacuum; and a book can easily be lifted with the nozzle.

For the winter three months, November to February, the total bill for gas was £8 8s.—gas at 5s. 9d. per 1000 c.ft. for heating and cooking, and 5s. 3d. for the engine. This works-out very cheap, considering the fact that the gas-fires were used for comfort, and not for show, and the engine gas represented all lighting in the house, four hours light each night in the hen-house, the electric washer, iron, kettle, vacuum cleaner, and power for the workshop. In short, the all-gas labour-saving house is a practical success; and he would not like to go back to coal-fires, with their dirt and labour.

Mr. Chalmers was awarded a cordial vote of thanks.

LOW TEMPERATURE CARBONIZATION OF COAL.

By Dr. C. H. LANDER, representing the Fuel Research Board.

[A number of papers dealing with the subject of low-temperature carbonization of coal were presented for discussion at a meeting in Cardiff, on Thursday, the 20th inst., of the South Wales Institute of Engineers. These will be noticed in the "JOURNAL" as opportunity offers; and we give to-day the first, which was by Dr. C. H. Lander.]

In the report of the Fuel Research Board for the years 1918-1919, the wider aspects of the low-temperature carbonization of bituminous coal were dealt with at considerable length; and the history of its introduction to the Admiralty as a possible home source of fuel oil for the Navy was given in some detail. In the report to the Lord President of the Privy Council, now in the Press, and shortly to be published for the Department of Scientific and Industrial Research by H.M. Stationery Office, we have dealt with the experimental and technical developments of the subject during the past few years, not only at H.M. Fuel Research Station, but in other fields of activity. For the purposes of the present discussion, the following remarks embody the preliminary review of the situation in connection with low-temperature carbonization which is discussed at length in the report referred to, which also contains the full results of the experimental work at H.M. Fuel Research Station.

As a possible source of home supplies of fuel oil for the Admiralty and for the Mercantile Marine, the low-temperature carbonization of bituminous coal continues to be a problem of national importance. Though for the time being the period of scarcity and high prices which resulted from war conditions has been succeeded by a period of plentiful supplies and lower prices, the broad fact remains that, for its requirements of fuel oils of all kinds, this country has to depend upon overseas sources of supply. During the past eighteen months, the price of fuel oil has fallen from over £15 per ton to from £3 to £4. The bearing of this fall in price on schemes for the low-temperature carbonization of coal will be at once appreciated, when it is stated that it represents a drop of at least 10s. in the value of the oil obtainable by carbonization from one ton of coal. Though this fall is partially compensated for by the reduction in the price of coal which has occurred during the past year, the startling fluctuation in price serves to emphasize the absolute dependence of the price of fuel and other oils on influences outside of the control of this country. This absence of control over prices introduces a speculative element which cannot be ignored in the consideration of schemes for the production of fuel oils from home sources. From this point of view, it is perhaps fortunate that fuel oil is only one of the three principal products of carbonization—gas, oils, and coke. Of these the coke is by far the most important, as it amounts to about 70 p.ct. of the weight of the coal carbonized, while fuel oils and gas each only amount to about 8 p.ct.

As the coke can be produced in the form of a smokeless solid fuel suitable for domestic purposes, the profitable working of the process must largely depend upon the recognition by consumers of its superiority to raw coal as a fuel. To be effective from the commercial point of view, this recognition must take the practical form of its wide adoption as a domestic fuel for which the consumers are willing to pay a price per ton somewhat in excess of that which it would have been necessary to pay for the house coal which it would replace. During the past two years, low-temperature coke has been put on the market in small quantities from at least four different sources, each of which is characterized by differences in the methods and apparatus used for its production, as well as by differences in the qualities of the product, and the form in which it is presented for consumption. Broadly speaking, however, there is a consensus of opinion—among those who have used coke produced from suitable coals by carbonization at or about 600° C.—that it is an admirable domestic fuel. So far as consumers are concerned, the question still awaiting answer is what extra price they will in the long run be prepared to pay for this fuel as compared with coal; while for intending producers the question will be whether or not this price will pay for the cost of manufacture, *plus* a sufficient margin of profit to justify its production on a large scale.

As stated above, the three principal products on which this industry must be based are coke, oils, and gas. As regards the oil products, we have seen that there is a practically unlimited outlet for home-produced fuel oils, but that the prices at which they must be sold will for many years to come be entirely controlled, not only by the inevitable fluctuations in the world's output of petroleum, but also by the policy of the great financial groups governing its production and distribution. During the last fifty years, the shale-oil industry in Scotland has had to face the grave uncertainties which have resulted from this outside control of production and prices; and the group of companies which have survived the ordeal have only done so by the exercise of the highest technical and commercial skill in the preparation and marketing of all the products of the industry. In considering the possibility of the establishment of an entirely new industry for the carbonization of coal, which is at present consumed in the raw state, the experiences of the shale-oil industry—technical and economic—must be kept ever in mind, even though it must be recognized that the parallelism is far from complete.

A similar analogy exists between the new industry and the well-established coke and gas-making industries. In this case also an intimate knowledge of the experiences and practices of the older industries is of the greatest importance in considering the development of the new. The analogy must not, however, be pushed too far; for not only are the central technical problems somewhat different, but the qualities of the products are so distinct that they will for the most part appeal to a new set of consumers. The rich hydrocarbon gas of the low-temperature carbonization will, however, establish a link between the old and the new industries.

No one who is in intimate touch with the gas industry would to-day suggest that any system of carbonization at 600° C. is likely to supersede the present gas-works practice of carbonization and gasification at 1100° to 1300° C. We cannot, however, ignore the fact that the widest and most natural outlet for the rich gas from carbonization at 600° C. would be through the organization and distributing systems of existing gas undertakings. This gas as an enriching agent for raising low-grade gas to a higher standard of calorific value would to many gas undertakings be worth from 4d. to 6d. per therm, delivered into their gasholders. The potential value of the gas obtained from one ton of coal carbonized at 600° C. may be taken as 27 therms, which, at 4d. per therm, would realize 9s. per ton of coal carbonized. As the value of this gas for enriching purposes becomes generally realized, this product will take its place as one of the most valuable, and at the same time the least speculative, of the assets of low-temperature carbonization.

The rapidly varying prices of coal and its products render estimates of profit and loss based on current prices of to-day more or less speculative. We believe, however, that it may be assumed that the price obtained for the coke as a high-class domestic fuel will be sufficient to meet the entire cost of the coal used in its production; that the crude oils (amounting, say, to 14·5 gallons) can be sold at an overhead price of 5d. per gallon; and the gas at 4d. per therm. The two latter products would then realize respectively 6s. and 9s. per ton of coal carbonized, or unitedly 15s., with which to meet the costs and charges of manufacture other than the outlay on coal, and to provide a profit. These figures are based on certain straightforward assumptions, which are perfectly open to re-examination at any time; but they are cited here mainly to give some indication of the margins on which this industry would have to be run, and to show the extent to which the working margin of profits must depend on the evolution of an apparatus which can be cheaply erected, worked, and maintained, and from which the yields and qualities of the products conform to the standards which have been reached in the experimental work at the Research Station.

The experimental work of the past two to three years has for the first time placed in our hands trustworthy data on this subject, the details of which are embodied in the report which has been referred to. These data will, we hope, serve to correct some of the loose and unsupported statements which have been handed on from report to report without corroboration. At H.M. Fuel Research Station we are now in a position to make tests and to pronounce with confidence as to the suitability or otherwise of any given coal for carbonization at temperatures from 500° to 650° C., and to determine the proportions in which the more and less fusible varieties of coal should be blended in order that the most satisfactory results may be obtained.

As the direct outcome of this experimental work, low-temperature coke has been regularly produced on a works scale in the form of cakes which are sufficiently robust to stand the rough handling of transport. These cakes are cleanly and economical in use, are more easily kindled and kept alight than the raw coal from which they are produced, and their combustion is absolutely smokeless. This, as an industrial method, will stand or fall on a perfectly definite issue, which is whether or not it is possible to evolve an apparatus on sound engineering lines in which the capital and working costs will fall within the modest margin of working profit on which this industry must be founded. During the past years much pioneering work has been undertaken by us in connection with this problem, and new and intimate knowledge of its physical and mechanical difficulties has been accumulated, which has enabled us to overcome some, though not all, of these. This work is still being actively pursued.

The knowledge acquired through the experimental work at the Station is of great value to us in the critical examination of other proposed methods for the carbonization of coal at low temperatures, and has, we believe, enabled us to furnish useful guidance to other workers on the problem. We have from the outset recognized that the solution may at any moment be reached by the genius of an outside inventor; and we have therefore devoted much time to the study of all proposals which appeared to contain the germ of a possible success.

Broadly speaking, there are three distinct lines on which carbonization may be attacked:

1.—The crushed coal is exposed in thin layers in a gas-tight chamber to the action of heat which is passed through the walls of the chamber from an outside oven or combustion chamber, and is distributed through the mass by conduction, radiation, and convection. The layer of coal is maintained in repose during the period of carbonization—that is to say, it is not mechanically turned-over for the exposure of new surfaces to the action of heat.

2.—The crushed coal is exposed to heat in an externally heated gas-tight chamber, in which it is mechanically stirred and

turned-over so that new surfaces are exposed to the radiated, convected, and conducted heat from the walls of the chamber. Retorts of this type may be horizontal, vertical, or inclined: and the turning-over of the coal is effected by the movements of blades or conveyors.

3.—The crushed coal is exposed to the action of heat derived from the sensible heat of a large volume of producer gas, which is passed over and through the mass of broken coal. This gas is either generated by the combustion in a mixture of air and steam of a proportion of the coke which results from carbonization, or is generated in a gas-producer fed with an independent supply of coke.

From the first and second of these methods, if they are carried out in gas-tight chambers or retorts uniformly maintained at the pre-determined temperature, the quantities and qualities of the volatile products, gas, and crude oil from any given coal need not vary much from the established standards. The physical and mechanical properties of the coke, however, do vary over wide limits, and may greatly influence its suitability or otherwise as a domestic fuel. The economic possibilities of these methods can be judged on the lines we have already indicated, in which the main assets per ton of coal are 3000 to 3500 c.ft. of gas of high calorific value, 12 to 16 gallons of crude oil, and 14 cwt. of coke. The different ways in which these methods can be carried out can therefore be directly compared with each other and with the standards which have been set-up at the Research Station. In the third method, however, certain entirely new considerations are introduced, the chief of which is the alteration in the quality and quantity of the resulting gas. Instead of the 3000 to 3500 c.ft. of gas with a calorific value of 900 to 1000 B.Th.U. per c.ft., which results from the first and second methods, the third involves the production of 20,000 to 25,000 c.ft. of gas of a calorific value of about 230 B.Th.U. per c.ft. As the increased volume of gas is derived from the combustion of a proportion of the coke in steam and air, there is a corresponding reduction in the yield of coke.

It only remains to notice the bearing on this subject of the work of Messrs. Sutcliffe and Evans on the briquetting of pulverized coal. Our researches have shown the important part which is played by grinding and blending of different types of coal as a preliminary to carbonization in securing those qualities of homogeneity and physical texture which are so desirable in any form of smokeless solid fuel for domestic use. The addition of briquetting to the present preliminary preparation of grinding and blending would, we believe, go far to simplify and cheapen the subsequent operation of carbonization. Messrs. Sutcliffe and Evans have already developed this idea on their own lines; but they have been good enough to give us their co-operation in experimental work on the subject which we are carrying out at the Research Station. In the method of briquetting which has been developed by these inventors, pulverized coal at the ordinary temperature is subjected to a pressure of 10 tons per sq. in. Our experience has been that the briquettes produced in this way from certain coal blends suitable for low-temperature carbonization may be lacking in robustness; and during the past six months we have carried out experimental work on the briquetting of pulverized and blended coal at temperatures high enough to cause incipient fusion of some of the constituents. These experiments, which will be more fully dealt with in the report, show that it is in this way possible to obtain a more robust briquette by a pressure of 2 tons per sq. in. or less.

From the foregoing review of the situation, it will be evident that we have not yet reached the stage when a final answer can be given to the question: "Will it be possible to establish on sound industrial lines a new industry based on the carbonization of tens of millions of tons of coal per annum which are at present being consumed in the raw state?" We believe that it will be admitted, however, that the knowledge and experience which have been gained as the result of much patient work during the past few years have brought the answer almost within our reach; and there appear to us to be some grounds for the expectation that it may be a conditional "Yes"—the elements of uncertainty being mainly economic and social.

Society of British Gas Industries.

As already announced, the annual general meeting of the Society is to take place at the Hotel Cecil, on Thursday, May 11—the Right Hon. Lord Riddell of Walton Heath (the President) in the chair. The programme now to hand from the Secretary (Mr. Arthur L. Griffith) states that the time of the general business meeting is 2.30. At this the report of the Council for 1921-22 and the accounts for 1921 will be submitted, and the officers and Council will be re-elected. At 3.30 the President will deliver his address; and thereafter the new President will be inducted. The annual dinner will be at 7.30.

Reduced South London Gas Charges.—The South Metropolitan Gas Company announce that, as from the Midsummer Day reading of meters, the price of gas will be reduced in their area from 11½d. to 10d. per therm, which it is claimed will make the price the lowest charged for any gas supply in and around London. The Wandsworth, Wimbledon, and Epsom District Gas Company will at the same time reduce the price of gas in the whole of their area by 1d. a therm. The charge in Wandsworth will then be 1s. per therm, in the Wimbledon area 1s. 1d., and in the Epsom area 1s. 2·2d.

NOXIOUS EFFECTS OF THE SALINE SUBSTANCES IN COAL FOR CARBONIZATION.

By M. Boehm, Consulting Engineer, of Milan.

[A Paper read before the Italian Gas and Water Association.]

This is a subject of which we have only heard in gas technique in the last few years; and gas literature provides but brief and comparatively recent information upon it. I therefore think this paper, which constitutes the fruit of my personal experience in the matter, will be of interest to gas engineers.

In the metallurgical coke industry, there have for some time past been defined as "saline corrosions" certain abrasions of the refractory walls of the ovens which at first appeared as simple granulations, but after a short time became blisters on the sur faces in contact with the coal. The walls later presented such deformations and crevices as to hinder the action of the ovens, and cause difficulties in extracting the coke.

Effects on Ovens and Mains.

The first occasion on which I found myself faced with these troubles was in the year 1909, while testing a plant of chamber ovens at an important gas-works. The defects appeared a short time after the battery was started. But the period of guarantee had not expired; and the contractor was bound to reconstruct the walls of the chamber entirely at his own expense. On the completion of the contract, he was evidently quite unaware of the troubles which awaited him owing to the guarantee on the plant; for it was only after a few days' action that we noticed, to our painful surprise, that the extraction of the coke, though distillation was perfectly carried out, could not take place except by hand—a job requiring 40 to 50 minutes of hard work, instead of a minute or two. The phenomenon gave us much food for thought; the cause was unknown; and it was not possible to suggest a remedy at the time. Later on, I found that the trouble and other injurious effects were due to the presence of saline substances in the coal. These are chiefly chlorine and its compounds; the majority of the saline substances, in fact, consisting of sea salt, which is so diffused in nature that it necessarily is included among the impurities in coal. Now sodium and chlorine between them give rise to serious troubles in gas service and cognate industries.

I first had occasion, in 1905, to notice the presence of chlorine among the distillation products of coal when inspecting the hydraulic main of an oven battery with inclined retorts. I came across some large crystals, which analysis showed to be ammonium chloride; and in 1913, in Rome, in the collecting main of chamber ovens whose hydraulics were working with unsealed dip-pipes, important deposits of ammonium chloride were observed mixed with pitch and coal dust.

Effects on Tar-Still Plant.

There appears to exist no doubt that corrosion of the domes of tar-distillation plants is to be attributed to chlorine, which, however, is not found among the constituents of the tar; while to the action of hydrochloric acid developed during the direct absorption of ammonia by means of sulphuric acid by the Otto system, is attributed most deleterious corrosion of the metallic parts of the saturator and successive apparatus. In the continuous tar distillation plant, built at Chiasso (Switzerland) during the war, in which the tar is circulated at about 380° C. under a pressure of about 20 atmospheres, corrosion in a coil exposed to direct heating was observed to a disconcerting degree near the valve separating the coil from the expansion tank. In fact, no metal was able to resist this action; and, after repeated trials, it was found that only silica would serve, and accordingly the valve was made of this material. Further information was not available; but I am certain that the troubles were due to the presence of chlorine, probably as hydrochloric acid. To almost all of my colleagues who during the war produced benzole are known these noxious effects, to which both wrought and cast iron coils of distillation columns in benzole plant are exposed. I am of opinion that these also are due to the saline substances contained in coal; for chlorine in the presence of ammonia gives rise to the formation of ammonium chloride; and, unless electrolytic action is excluded, corrosion cannot be absent. Apart from this, however, conditions are favourable, since the liquid in ebullition is in this case in the presence of metals and of the salt commonly used in electric batteries; and anyway the fact remains that the drawbacks were not observed in plants where the benzole recovery took place after the elimination of the ammonia.

I had to go through an unenviable experiment in this connection on a continuously working tar distillation plant which was installed during the war. The apparatus, which was entirely new to us, answered our expectations satisfactorily. It was working in a manner perfectly safe, regular, and economical. The separation of tar into light, intermediate, heavy, and anthracene oils and pitch gave products which were commercially pure, and better than those that have hitherto been obtained by old systems. It had been observed, however, that at times the service had to be interrupted owing to obstructions in the oven coils and corrosions in some metallic parts. The phenomenon was very noticeable with certain tar qualities, and almost vanished with other kinds, and analysis showed the incrustation to consist of ammonium

chloride mixed with carbon substances. A similar apparatus had been working for some time in other foreign gas-works without giving rise to difficulties of this nature; while in a Lennard plant for continuous tar distillation of the South Metropolitan Gas Company, which I had had an opportunity of visiting, these drawbacks were entirely unknown. The tar coil, consisting of a large cast-iron pipe placed within the oven, where the temperature reached about 300° C., had been in use uninterruptedly year by year. Very slight corrosions were noted only at the connecting piece at the first condenser, which is renewed from time to time.

In the literature on this important question there are only sporadic references—scattered in various journals—probably because the impurities with which we are dealing are contained in various measure in different kinds of coal, and sometimes are present in harmless quantities. In a publication printed in Germany at the end of 1912, we read that the corrosions of coke-oven chamber walls are due to the chemical actions of sodium salts—chloride, sulphate, and carbonate—contained in coal, which act on the refractory material raised to a high temperature. From experiments it has been observed that saline corrosions produce—decreasing with the amount of silica, and increasing with the amount of potash and soda alkalies contained in the refractory material—a lowering of its melting temperature. To obviate the drawbacks of corrosions, it has been suggested to mix with the coal to be distilled a certain amount of silica in any form, in order to fix the saline substances during distillation, and thus preserve the chamber walls; but this remedy, besides entailing considerable expense in the formation of the mixture, implies an increase of 2 to 3 p.ct. in ash.

According to the reports of a German coking plant, oven-wall corrosion is due to the action of the alkali substances, and perhaps also of the magnesia salts, which, depositing in the pores of the refractory material, form a silicate which easily melts—this, in fusing, enlarging the small cavities into which the dampness of the coal penetrates. It is well-known that the coal washed by coke plant contains 12 to 20 p.ct. of water saturated with salts which, while rapidly evaporating, might fill the crevices with salts, and give rise to new fissures which, in turn, are filled with salt. To this action, which is repeated at each charge, we must add the effect of the various expansions of the original material, and that which has been modified by chemical action.

In the Bulletin of the Italian Gas Association of April, 1914, references extracted from English papers appeared on the corrosive effect of certain salts in Derbyshire and Yorkshire coal on the refractory material of the retorts used in the Birmingham Corporation plant. From these it seems that, although most corrosion is due to sodium chloride, the harmful effects are to be ascribed not to this salt only, but to all the soluble salts contained in coal. The amount of chlorides in coal was found to be extremely variable; and they are often supposed to be derived from the salt water with which coal is washed at the mine. A salt content of 0·05 p.ct. would be almost harmless on refractory material.

In the "Chemical Trade Journal" in 1918, Mr. L. Crawford reports some figures with the object of inducing others to continue experiments to establish the relation between the chlorine percentage and the corrosions of still domes and other parts of tar-distillation plants. The percentages of chlorine found in seven tar samples vary between 0·0053 and 0·148; and in one case 0·226 p.ct. was found. From experiments carried out over a year, he does not feel inclined to draw any general conclusion; but, in his opinion, a percentage of 0·1 of chlorine in the tar should be considered the maximum permissible. It might be added that it is risky to fix limits to the impurities of a product as indefinite as tar, in which ammonia liquor is present in extremely variable amounts and composition.

I borrow from the classic treatise by Lunge on the ammonia industry, the following compositions in grammes per litre of the ammonia liquors in four gas plants:

—	Zwickau Coal.	Ruhr Coal.	Saar Coal.	
	Chemnitz.	Bonn.	Treveri.	Zurich.
Ammonium Sulphydrate, Sulphide, Bicarbonate, and Carbonate . . gr.	6·98	46·822	49·29	7·56
Ammonium Sulphate . ,,	0·46	1·32	4·92	1·92
,, Chloride . ,,	30·495	3·47		
Total Ammonia . ,,	12·09	18·12	15·23	3·47

Even if we take into account the varying liquor production, this table shows clearly why in the gas-works in German Switzerland, where Saar coal is preferably used, the effects of chlorine in coal distillation are not noticed. Thus, referring to the same concentration degree, we see that 10·6 gr. of Saar coal should correspond to the 30·5 gr. of ammonium chloride of Zwickau coal, while in reality we hardly obtain 1·9 gr. per litre taking the chloride and sulphate together. It is important to observe that the presence of ammonium chloride is noticed merely in the liquor from the hydraulic main, and not in that obtained from the scrubbers and other washing apparatus.

In 1914 Mr. J. W. Broadhead, at the meeting of the Society of British Gas Industries, having observed the drawbacks due to the salt in coal distilled in continuous vertical retorts, referred to experiments showing that at 700° C. sea salt is decomposed into chlorine and sodium—the chlorine combining with NH_3 and giving ammonium chloride, which is volatile and is deposited as crystals at the cold points of (say) the hydraulic main, giving rise to stoppages.

On the presence of chlorine in coke and coal, determinations have been made by S. W. Bridge and A. de Waele ("The Analyst," 1915). In thirteen tests on coke made from British gas coal, one test on metallurgical coke, and one test on cannel coke, Bridge found the following percentages of chlorine reckoned as sodium chloride:

—	Soluble Chloride.	Total Chlorine.
Gas coke	0·013 to 0·262	0·039 to 0·499
Metallurgical coke	0·007	0·071
Cannel coke	0·357	0·918

By distilling at a high temperature, a greater amount of chlorine is volatilized than at a low temperature; and the content of soluble chloride in coke obtained at a low temperature is greater than that in coal. A. de Waele has determined the chlorine content in six coal samples giving considerable corrosion in boiler tubes (determined by means either of lime incineration or extraction by hot water). The percentages in five tests were 0·21 to 0·35; in one test, 0·018 p.ct. The washing test gave the same results. In each case we had, therefore, to deal with soluble chlorides.

Corrosion of Coke-Oven Bricks.

The "Gas Journal" in 1919 published a report taken from another British review on the corrosion of coke-oven bricks [see "Journal," Vol. CXLVI., p. 700; and Vol. CXLVIII., p. 75]. This phenomenon is due to the presence of sodium chloride, and sometimes sodium sulphate, which are partly carried off in washing, but not completely. The chloride first sublimates, and is then decomposed. In the presence of water (steam), it produces an acid, and probably sodium oxide Na_2O. A fraction of this acid turns the iron and alumina of the bricks into chlorides and the remainder combines with the ammonia. The oxide attacks the acid parts of the bricks, and forms complex silicates. If the coal is so chosen that it contains free silica, soda silicates are formed, and the corrosive action is diminished.

The Remedies.

Let us now come to the remedies.

(1) With regard to the action of saline substances upon refractories, the problem seems to be practically solved; and the solution adopted also appears to afford the advantage of increasing the output of chamber ovens, while shortening the period necessary for carbonization by a few hours. The refractory material used for the construction of ovens and retorts may be sub-divided into two classes—clay-like and calcareous. To the former class belong all those materials generally used the mixture of which consists of any amount of refractory clay. They are called "basic" when containing 20 to 40 p.ct. of alumina (Al_2O_3), and are composed of calcined refractory clay and lime; and "acid" when containing an excess of silica reaching 80 to 85 p.ct. of SiO_2. They consist of refractory sands and quartz, mixed with refractory clay. To the latter class belong the quartzite material, containing up to 95 p.ct. of silica, and composed of almost pure quartz bound together by a small quantity of lime milk, so that the product does not contain more than 1 to 2 p.ct. of CaO. Although this material has a lower melting-point than clay material, it is preferably used, because at higher temperature it withstands pressures more satisfactorily. Melting at 1700° and withstanding a pressure of 170 Kg./sq.cm. at standard temperature, it carries 40 Kg./sq.cm. at 1500°, whereas clay material softens much below 1300° or 1400°, though having a considerably higher melting-point; this being measured by means of Seger cones. Silica, however, presents the serious disadvantage of swelling under the action of heat, not only in baking, but also in its subsequent use; and this has been a serious obstacle to its adoption.

This phenomenon was explained later on by Le Chatelier's work published in the "Revue de Metallurgie" in the year 1916 and 1917, and by other authors. As a result of these researches (which showed that silica by the action of heat is turned into tridimite and cristobalite of different specific weight and expansion coefficient), by an adequate selection of the raw material, and by raising the material to a high temperature while baking, it is possible to obtain products that give entire satisfaction, while keeping the working temperature of the oven higher than usual, to the advantage of the efficiency. They also resist the saline action of coal admirably, as it appears from reports on the service of plants in Germany, where washed coal is distilled containing sometimes over 16 p.ct. of water.

(2) The problem is far from simple as far as tar distilleries are concerned, having in view the facts that the cause of these drawbacks is due to the presence of ammonium chloride, that this salt begins to sublimate below 100°, that at a high temperature it dissociates into NH_3 and HCl, and that in distillation metallic material has to be employed.

In ordinary tar distillation plants, where the temperature at the end of the operation reaches about 300°, in order to preserve the still wall it is found useful to provide the dome with an internal collector, serving to collect the condensations from the liquid, and preventing their gliding along the internal wall of the

still. The corrosive action, however, on the neck still remains as well as in the first pipes, which must be often renewed. As far as I know, no other device has been adopted in the practice of the old system distilleries.

In the works to which I have alluded, various measures were taken. That one was dealing with such a considerable corrosive action as to compromise the preservation of the apparatus, is shown by the decrease in weight of some test tubes and iron plates exposed to the passage of the tar oil vapours. A disc of sheet iron with a total surface of about 2 sq.in. lost as much as 60 gr. in weight, and a piece of ½-in. iron tube, 20 centimetres in length, diminished in weight by 147 gr. in eight days, during which 110 tons of tar were distilled.

First of all filtration was attempted. The tar proceeding from the producing plant was slightly heated, and passed through the filter press, where a large amount of fixed carbon was collected, constituting part of the substance that obstructed the oven coils; but the result was negligible.

In order to diminish the corrosion, it was also suggested that the oven coil should be substituted by a coil in a special siliceous cast-iron material, which might have easily been obtained in Italy during the war. Apart from the enormous expense, the suggestion was not carried out, because, though a better preservation of the oven could be expected, the causes of corrosion in the successive apparatus was not eliminated, nor could the stoppages be prevented.

Considering that the troubles relative to corrosion were due to the dissociation of ammonium chloride, which could readily take place at the oven working temperature, the transformation of the ammonium salts into a sodium salt (a chloride) was attempted, which, as we know, is more stable because it has a dissociation temperature higher than that of ammonium chloride. Thus the chlorine fixed as an innoxious compound would have flown out of the distillation column with the pitch. From laboratory tests, it was found in the first place that the double decomposition of the salts was not complete, as the reaction ceased at an intermediate state of equilibrium, and in the second place that stoppages were by no means eliminated.

The division of the heating of tar into periods was attempted; but again with no better success. In the first place, it was dehydrated in a continuous manner by means of heating at about 130°, in order to free it from NH_3 and ammonia salts before it entered the oven coil, where in the second phase the temperature of about 300° was reached, which was necessary for distillation. It was noted, however, that the elimination of ammonium chloride was very incomplete. Part of it adhered to the tar-heating coils, in which the superheated steam was circulating; and besides, the heating expense was considerable in spite of the recovery of waste heat.

This system being also abandoned, recourse was had to centrifugation. By means of an "essoreuse," the tar, slightly heated, was centrifuged, after having been washed, if necessary. The ammonia liquor was thus eliminated, by reducing its contents below 1 p.ct. During this operation, the separation of fixed carbon also took place. This is collected on the wall of the collector of the centrifugal device; and extraction is made from time to time so that filtration is unnecessary. Experience has shown that the distillation of anhydrous tar proceeded without any of the difficulties under investigation.

It may be concluded that during the distillation of tars from salty coal, previous centrifuging is absolutely necessary, in order to eliminate the ammonia liquors, and particularly ammonium chloride, which is the cause of serious troubles. It may be added that, as a rule, this preliminary operation is advantageous in any quality of tar to be distilled, because it allows a considerable amount of heat to be saved, which is required to evaporate the water generally combined with the tar.

VAN STEENBERGH GAS PROCESS.

In the Van Steenbergh patent continuous process for the production of water gas, which is being introduced in the United States by the American Gas Improvement Company, the inventor proposes—in order to secure continuity in gas manufacture, without interruption or variation in temperature conditions, and without the disadvantage of ash, clinker, reversals, &c.—to use petroleum (preferably the gas-oil fraction) as the gas-making material. He also proposes to employ electric heating units to keep-up the reaction temperature needed to produce water gas by the reactions between steam and oil. The steam is to be superheated to about 1800° Fahr., the oil is to be vaporized, and the two are mixed just before entering the reaction chamber, in which a temperature of 1200° is expected to be maintained by the electric heaters. These essentials are supplemented by utilizing the heat in the water gas coming from the reaction chamber to make steam and to vaporize the oil; the steam going to a separately fired superheater.

There are several patents covering the process. One of these describes a gas-generator or upright shell lined with refractory or insulating material, in which are placed horizontally alternate pairs of electric heating units and refractory baffling units. These units are coated with a refractory substance, so that the oil, by the catalytic action on the superheated steam of the coatings of the electric heaters, is split into permanent gases rich in high illuminants—such as gases of the olefine and perhaps acetylene series. By using electric heat, the temperature can be so controlled between 800° and 850° Fahr. as to split the hydrocarbon oils without decomposing the steam. The heating tubes will be heated to a temperature ranging between 1600° and 2000° Fahr., and preferably between 1600° and 1800° Fahr. The specification insists upon the catalytic agent as a necessary part of the process, and assumes two chambers, one above the other, heated to 800° to 850° Fahr. by the electric units, while the generator below is kept at 1600° to 2000°.

The description of the electric heating unit states that the outside "plate iron" tube runs through the shell of the generator, and within it is placed the heating unit surrounded by an insulating envelope consisting of a coating paste composed of finely-ground silica and finely-ground carbonate of lime mixed with sodium silicate diluted with water to form a pasty mass. This paste is moulded round the cylinder, and allowed to harden. The cylinder, thus coated, has a cardboard outside; the interior being filled with granular carbon—hard carbon electrodes at either end pressing against this resistant filling. The electric current flows through the loose carbon, and heat is generated through the resistance. The catalytic coating, it is said, prevents the iron, when heated to incandescence, from spoiling the illuminating quality of the gas by causing deposition of carbon. It also aids, by catalytic action, in splitting-up the oil into gases of high illuminating quality. The coating separating the heating tube or cartridge from the external heating tube is a good conductor of heat and a poor electric conductor. The cardboard covering of the carbon, on which this insulating coating is placed, is, of course, immediately carbonized. The temperature will depend upon the quantity of current used, so that either oil gas or oil-water gas can be made in the generator.

Reporting upon the process, Dr. D. B. Steinmann (a New York consulting engineer) states that by this process it is possible to make 1000 c.ft. of uncarburetted water gas of low calorific and illuminating power from 1·93 gallons of oil. A 22 c.p. and 495 B.Th.U. gas can be produced from 3·19 gallons of oil per 1000 c.ft.; or a 22 c.p. and 600 B.Th.U. gas from 4·08 gallons of oil. Figures are quoted by him from which, he says, "it is evident that the Van Steenbergh process will be decidedly more economical in coal and oil than existing processes."

The Chief Electrical Engineer in charge of the electric furnace department of the General Electric Company of Schenectady (N.Y.) has made an estimate showing the total manufacturing cost of producing 60,000 c.ft. of 22 c.p. and 600 B.Th.U. gas by the Van Steenbergh process to be $21·96, or less than 35 c. per 1000 c.ft.

Natural Gas and Liberation of Carbon Monoxide.

Tests have been carried out under the supervision of Mr. I. V. Brumbaugh and Mr. G. W. Jones, of the United States Bureau of Mines, to ascertain the amount of carbon monoxide that can be liberated from the various types of domestic burners, when operated with different flame characteristics, different rates of consumption of natural gas, and different positions of the burner from the utensil. While a condition favourable for the production of carbon monoxide results with the usual type of gas-burner when the flame is insufficiently aërated by placing the burner too close to the utensil, the efficiency of natural gas burners is greatly increased by placing the burner close to the utensil. It is, they point out, therefore very important to know how close the burner can be placed to the utensil without producing dangerous quantities of carbon monoxide. Three different types of domestic burners as commonly used were tested. Analysis of the combustion products from burners using natural gas, and burning in contact with utensils containing liquids at or below the boiling-point of water, shows that carbon monoxide is liberated; the quantities depending upon: Distance of utensil above the burner; the height of the blue inner cone of the flame; the type of burner used; flame characteristic (ratio of the volume of primary air injected into the burner relative to the volume of gas consumed); and the rate of consumption of gas per hour. It was observed that no carbon monoxide was found when the distance of the utensil from the burner was such that the blue inner cone of the flame did not touch the utensil. For the same rate of consumption and same ratio of primary air to gas, one design of burner may permit the utensil to be placed as close as ¾ in., while another may need a distance of more than 1¼ in. in order that the amount of carbon monoxide may be negligible. For a given ratio of primary air to gas, the highest percentages of carbon monoxide are produced when the utensil is placed so close to the burner as to cause a "floating" flame. When using the same burner with the utensil in a position that causes the flame to "float," the carbon monoxide increases as the primary air rate is decreased. Therefore, they say, a yellow flame will produce carbon monoxide at a rate greater than a blue flame. Much of the carbon monoxide is produced by the smothering of the flame with the products of combustion which are hindered in their escape, with a close position of the utensil to the burner, by the unavoidable baffling of the supply of secondary air.

Yorkshire Junior Gas Association.—This (Wednesday) afternoon an inspection is being made by the Association of the works at New Wortley of the Leeds Fireclay Company.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Remuneration of Chemists in Gas-Works.

SIR,—I enclose herewith a copy of a letter addressed to Mr. R. G. Shadbolt, Chairman of the General Council, National Association of Technical Gas Officials, with regard to the letter appearing under the title "The Weak Spot of the Industry" in the issue of the "JOURNAL" dated Jan. 25, 1922.

RICHARD B. PILCHER,
Registrar and Secretary.

The Institute of Chemistry,
30, *Russell Square, W.C.,*
April 20, 1922.

[ENCLOSURE.]

April 20, 1922.

R. G. Shadbolt, Esq.,
Chairman of the General Council,
National Association of Technical Gas Officials,
Central House, New Street, Birmingham.

SIR,—The attention of the Council of the Institute of Chemistry has been directed to a letter purporting to have been addressed by you, under the date of Jan. 20, 1922, to the "GAS JOURNAL," and published in the issue of that journal dated Jan. 25, 1922.

In this letter reference is made to the remuneration of "chief chemists," who are classified by your Council with chief draughtsmen and outside superintendents of the distribution department with the proposed scale of minimum salaries which your Council appear to regard as "quite reasonable," but which the Council of the Institute of Chemistry regard as quite the reverse.

You appear not to be aware that properly trained chemists, such as gas undertakings should employ, are required to undergo at least the equivalent of a four years' university course, and do, in fact, earn remuneration far in excess of the figures indicated in your schedule. Your letter professes to deal with the status and dignity of technical gas officials; but the Council of the Institute would venture to point out that your efforts are likely to do more harm than good in view of your attitude towards the scientific men on whose science the industry mainly depends, the lack of recognition of whose importance is without doubt "the weak spot of the industry."

In the view of the Institute, such chemists should be regarded as the professional equals of the engineers, although the administrative officer, whether engineer or chemist, should obviously be remunerated for his additional responsibility.

The scale is, indeed, a clear indication that the National Association of Technical Gas Officials does not appreciate that the gas industry requires the services of chemists of the highest calibre, and that it is only by the employment of such chemists that the industry will maintain its position for the benefit of all interested parties, employers and employees.

(Signed) RICHARD B. PILCHER,
Registrar and Secretary.

Market Values of Gas Stock.

SIR,—I beg once more to call your attention to the price quoted in the "GAS JOURNAL" for my Company's 5 p.ct. capital stock.

The following shows the prices quoted in the "JOURNAL" for this particular stock at various dates for the last two years:

Date.	Price.	Latest Dividend.
		Per Cent.
January, 1920	£56—£61	3¾
March, 1920	£54—£59	3¾
June, 1920	£52—£57	3¾
September, 1920	£52—£57	3¾
December, 1920. . . .	£52—£57	3¾
March, 1921	£52—£57	3¾
June, 1921	£52—£57	3¾
September, 1921	£54—£56	6
December, 1921. . . .	£54—£56	6
April, 1922	£53—£55	6

Apart from the question of the increased dividend, one would have thought that the trend of the money market alone would have been sufficient to cause a fairly big advance in the price of this stock.

The South Metropolitan Company's stock now stands at £96, and the last dividend was 5 p.ct. The last two dividends on my Company's 5 p.ct. capital stock have been at the rate of 6 p.ct. per annum. I am aware, of course, that there is a large market in the South Metropolitan Company's shares; but this fact alone should not be sufficient to account for such an absurd disparity between the prices of the two stocks.

Within the last two months, the Engineer of this Company and I have bought some Maidstone capital stock at the rate of £75 p.ct., and considered it cheap at that. The statutory rate of the interim dividend payable in March last was £7 2s. p.ct. per annum; but simply as a matter of precaution the Directors paid £6 p.ct. on account. The difference, however, may be made-up in the final dividend for the current financial year.

In view of the above, I should be glad to hear if you consider the price of £53-£55 a fair valuation of this stock.

F. A. GULLAND,
Secretary and Accountant.

Gas Company,
Maidstone, April 21, 1922.

[The answer to the question in the last paragraph is that we do not. The market quotations of some gas stocks are in fact a scandal to-day, having regard to the dividends now being paid.—ED. G.J.]

Efficiency Comparisons with Old and New Types of Appliances.

SIR,—In your issue of the 12th inst., reference is made in "Editorial Notes" to the paper read by Mr. George Keillor, of Greenock, before the North British Association of Gas Managers, and particularly to the tests with cookers, which, as you remark, were of a modern type for the tests with low-calorific gas, and of an old type with gas of high calorific power; and you rightly say "this is not comparative."

The criticism might have been extended to the tests with incandescent burners (p. 95, col. 2), in which a 3-light cluster of bijou mantles, consuming 5 c.ft. of 400 B.Th.U. gas (2000 B.Th.U.) per hour, is compared with a single "universal" mantle consuming 4·53 c.ft. of 563 B.Th.U. gas (2551 B.Th.U.) per hour; "so that, on a thermal basis, low-grade gas is the more economical in everyday use."

I submit that no such deduction can be drawn from the se tests. Had Mr. Keillor used the same burner and mantles in each case, and maintained the same pressure and heat units per hour, simply varying the volume in accordance with the calorific power of each gas, a trustworthy comparison of the merits of the gases only would have been obtained.

One would not compare the efficiency of a liner using oil fuel for the boilers and superheated steam and geared turbines, with another liner using coal-fired boilers and reciprocating engines, and attribute all the economy in the first case to the oil fuel.

W. C. GOODCHILD.

Midland Railway,
Chief Mechanical Engineer's Office,
Derby, April 24, 1922.

High Therm Results with Vertical Retorts.

SIR,—I would like to make a few remarks respecting Mr. George Keillor's paper on the subject of "Thermal Efficiencies" to the North British Association of Gas Managers.

A word not only of acknowledgment, but of approbation, is, however, first due to him for the very able and comprehensive case he made out on behalf of calorific values from 380 to 425 B.Th.U. per cubic foot. That they have a sphere, and can prove effective therein, most of us are prepared to admit; but, as Mr. M'Lusky in his comments afterwards pointed out, the question is very relative to a multitude of attendant circumstances; so that in so far as calorific value goes, say above 400 B.Th.U., the case of universal dogmatism in favour of either high or low values is untenable, and each case should be sorted-out according to the merits of results—the test by which Mr. Keillor has very ably solved his problems in his particular area.

What I have to dispute is the denial on the part of Mr. Keillor that yields of 100 (or thereabouts) therms of 425 B.Th.U. gas should not be acknowledged as attainable results on behalf of vertical retorts. To quote Mr. Keillor:

> "If in the interval it has been found impractical to produce these abnormal results in ordinary everyday gas-works practice (a matter of the kind of plant available) [the parenthesis is mine], then I think that we, as professional men, are justified in asking for their public withdrawal. Moreover, in view of the fourth report of the Gas Investigation Committee on the efficiencies of processes for manufacturing gas at Uddingston, and Test 5 on the wet basis, the Plimsoll line of the series, I think we may safely jettison all claims which exceed it. A make of 19.593 c.ft. per ton of 410 B.Th.U. gas (80·33 therms) from average Lanarkshire double nuts is the only certified result we have obtained so far; and it must hold the field until something better and equally reliable takes its place. In our search for higher thermal efficiency per unit of plant, I am afraid we shall have to rule-out the idea of coal conservation. If this were still demanded by the State, it would enable us to approach the subject in a different way. Large yields per ton of low calorific value gas would then be the rule."

In my remarks on these points, I would wish it to be understood that I am not criticizing Mr. Keillor's personal attitude so much as endeavouring to correct certain errors under which, clearly, he is labouring on account of unacquaintance with certain essential principles of thermal efficiencies, and which it is clearly the duty of a gas-plant maker to understand, but which are rather a matter of pure interest or curiosity to the user. I am fully aware of the reasons which account for his overlooking the factors; but, owing to the pertinence of his criticisms, and their possible far-reaching consequences, they necessitate correction.

In the first place, the Glover-West retorts used by the Fuel Research Board have realized certified results of the kind in question, attaining to even 100 therms and more of 460 B.Th.U. gas, with 30 p.ct. of steam. In the second place, it is not difficult to correlate this with the theoretical equivalent of 460 B.Th.U. gas, manufactured either in two plants, taking 70 therms of 550 B.Th.U. gas from South Metropolitan horizontals and 30 therms of 300 to 310 B.Th.U. gas separately made, or to assume part steaming of the horizontals to produce 500 B.Th.U. gas, with addition of the balance as water gas. There is therefore unimpeachable proof that gas plants are capable of being designed to realize such yields, apart altogether from the possibilities of combined processes of high and low temperature carbonization in one plant, resulting in higher calorific value of the initial distilled gases, coupled with better steaming and a higher steaming limit, thereby increasing both the quantity and quality of the total gas yields available per ton.

That existing verticals cannot attain beyond 100 therms or thereabouts when perfectly designed and controlled, I am quite prepared to admit. There definitely exists a limit beyond which it is impossible to reach with advantage. This is due to the thermal problems of carbonizing; and in accordance, as Mr. Keillor states, "low-grade gas in high yields per ton" figures as one of the alternatives. But the true solution of this problem—which I prefer not to state precisely at the moment—would satisfy both coal conservation and maintenance of the gas quality above 400 to 425 B.Th.U., even if making up to 125 to 150 therms per ton.

It is my personal conviction and knowledge that 100 therms of 480 to 500 B.Th.U. gas are quite realizable; and on this basis, of course,

it follows that lower grades will benefit still further. But coal conservation by economy of the setting thermal losses now inevitable, is a very important factor in the realization! And such fuel economy is *nowadays in the interests of all concerned with coal!*

119, *Victoria Street, S.W., April* 18, 1922. Wm. Everard Davies.

Gas Tar and Asphaltic Bitumen for Road Purposes.

Sir,—In a recent issue of the "Daily Mail" (April 10), in the course of an interview with Sir Henry Maybury, Director of Roads in the Ministry of Transport, Sir Henry is stated to have said, in regard to the use of asphaltic bitumen: "It is superior to gas tar, which has lost much of its road-making qualities in recent years owing to improved methods of gas making." Sir Henry further stated: "Gas tar as a road-binding material is now prohibited where roads drain direct into fishing waters."

Sir Henry Maybury is, of course, entitled to express his preference for asphaltic bitumen; but surely as Director of Roads he ought to realize that the material of a road surface is strictly conditioned by the resources of the locality. But I write to inquire whether, in the opinion of gas experts, Sir Henry Maybury's statement is strictly true.

Is not the alleged deterioration of gas tar more than balanced by superior methods of utilizing it—especially when mixed with slag, and not merely spraved?

12, *Bridgman Road, Teddington, April* 19, 1922. Dudley W. Walton.

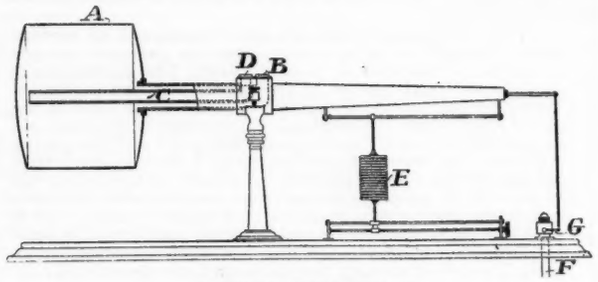
REGISTER OF PATENTS.

Regulating the Flow of Gas.—No. 176,524.

South Metropolitan Gas Company and Chandler, D., of Old Kent Road, S.E.

No. 34,917; Dec. 10, 1920.

This invention relates to apparatus for controlling or regulating the flow of gas to a testing instrument or the like, and more especially to that type of apparatus intended to compensate for variations in atmospheric pressure and temperature and in the density of a gas, in such a manner as to allow a standard volume of gas to flow per unit of time irrespective of such variations. The flow of gas is regulated by a valve which is controlled by an aneroid capsule or equivalent vessel, and by means actuated by the density of the gas.



Chandler's Flow Regulator.

The illustrations show diagrammatically one way of carrying out the invention. A base plate has mounted on it a standard carrying a weigh-beam, one arm of which is tubular and has secured to it a chamber A, the inner end being connected to a gas outlet B. Co-axial with the tubular arm of the beam is a pipe C, connected to a gas inlet D; while E is an aneroid capsule such as is employed in an aneroid barometer. The capsule is provided with arms or links; the upper arm being slidably mounted on a bar carried by the beam, and the lower arm being slidably mounted on a bar secured to the base. A threaded rod engages an extension of the lower arm, and is provided with a milled head for sliding the capsule E towards or away from the pivot of the weigh-beam. F is a pipe connected to the outlet B, and provided with a valve, the actuating level of which is indicated at G.

In operation, when a gas denser than that previously employed passes through the chamber A, the beam is tilted thereby and the valve in the pipe F opened more fully; and *vice versâ*. When the barometic pressure decreases or the temperature rises, the beam is similarly tilted by the capsule E and the valve opened more fully; and *vice versâ*. Lack of space prevents our giving illustrations of three modifications of the above (employing liquid-sealed bells) which are included in the specification.

Atmospheric Burners.—No. 176,546.

Weyman, J. E., of Newcastle-upon-Tyne.

No. 35,671; Dec. 20, 1920.

The claims of the patentee are as follows:

1. In apparatus for burning blast furnace, coke oven, producer, and like gases as fuel in atmospheric burners, a regulator separate from the burner and controlled by a governor outside the passage of the gas to the burner, but actuated by the gas pressure so that the air supply is regulated in accordance with the gas pressure.

2. The fixed part or body of the regulator divided by a partition into two parts, one for the primary and the other for the secondary air, each with ports or openings; a revolving disc or movable shutter having corresponding openings or ports; and a second disc or shutter adjustable and connected to the main disc in such a manner as to allow of the ports for the secondary air being more or less closed, the main disc being controlled by a governor outside the passage of the gas to the burner but actuated by the gas pressure so that both the primary and secondary air for combustion are regulated in any proportion in accordance with the pressure.

3. Annular spaces surrounding the combustion chamber or furnace so divided as to allow of the primary and secondary air for combustion passing from the regulator being separately heated on their way to the burner.

Manufacture of Ammonium Sulphate.—No. 176,977.

South Metropolitan Gas Company and Parrish, P., of Blackheath.

No. 3033; Jan. 24, 1921.

Ammonium sulphate discharged in acid condition from the usual saturator contains pyridine sulphate, which is decomposed with evolution of pyridine vapour when the ammonium sulphate is subsequently neutralized. The usual method of neutralization, the patentees point out, does not lend itself to the recovery of the pyridine, while escape of this vapour into the atmosphere is objectionable to the workers. If it were practicable to work the saturator to neutrality or slight alkalinity, the pyridine would be liberated therein and would be removed with the waste gases; but such procedure produces discoloured ammonium sulphate.

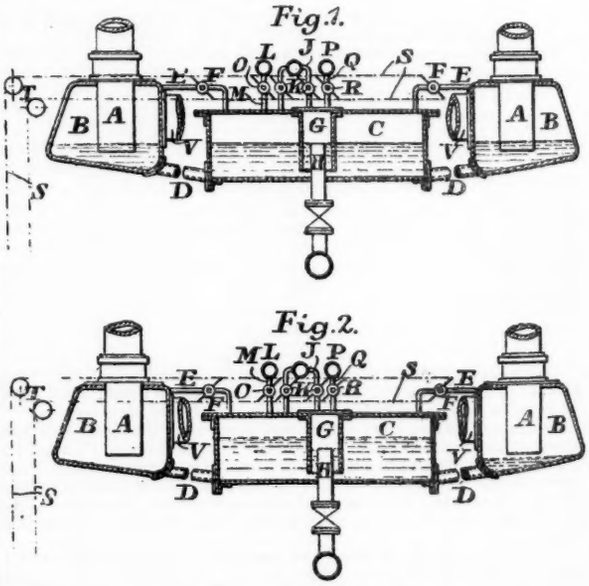
The problem of suitably recovering and disposing of the pyridine is solved by this invention by taking advantage of the fact that the ammonia from the fixed ammonia still is free from the impurities which cause the said discoloration. The ammonia from the free ammonia still and that from the fixed ammonia still are absorbed in separate saturators, A and B respectively. The saturator A is worked in the customary manner, and the salt discharged in acid condition is fed, after suitable drainage, into saturator B, which is worked to neutrality or slight alkalinity. The salt discharged from saturator B is ready for being dried. The pyridine is evolved in saturator B, and is recovered from the waste gases therefrom. Suitably, the salt discharged from saturator A is received in a centrifuge where it is separated from liquor (which returns to the saturator), and is then allowed to fall into a gas-tight feeding hopper delivering into saturator B. The salt from the latter is discharged into a second centrifuge to be delivered to the drying apparatus.

Collecting Gas from Retorts.—No. 176,891.

Carpenter, C., of Old Kent Road, S.E.

No. 35,334; Dec. 15, 1920.

Hitherto it has been the general practice to seal continuously with liquor the ends of the pipes from the retorts in an hydraulic main. In the production of gas on modern lines, the patentee remarks, it is now the practice to obtain greater efficiency by working with unsealed pipes during the period of carbonization, when all the retorts are closed. When the retorts are opened for discharging coke and recharging with coal, it is necessary for completely secure working temporarily to seal the ends of the pipes in the hydraulic main. The object of the invention is to provide means by which these pipes can be instantaneously sealed or unsealed, by varying the vacuum necessary to sustain the required liquor levels.



Carpenter's Dip-Pipe Seal.

Of the accompanying drawings, fig. 1 is a sectional elevation showing the pipes sealed, and fig. 2 shows the pipes unsealed. A are dip-pipes, B are hydraulic mains, C is a container connected to the hydraulic main by pipes D and by pipes E provided with equilibrium valves F. The container C is provided with an overflow chamber G in which is an overflow pipe H. The overflow chamber G is connected to the container C by a pipe J provided with equilibrium valves K. L is a main in which there is a vacuum of four inches for example; the main L being connected to the container C by a pipe M having a valve O. P is a main in which there is a vacuum of two inches for example, the main P being connected to the

overflow chamber G by a pipe Q having a valve R. S are cords or chains passing over pulleys T and adapted to actuate the valves F, K, O and R. V are gas outlet pipes.

When the valves F, K, O, and R are in the position shown in fig. 1, the valves F and K are open and the valves O and R are closed. The pressure being the same throughout, the level in the hydraulic mains B, container C, and overflow chamber G is the same, the dip-pipes A being sealed by one-and-a-half inches of liquor.

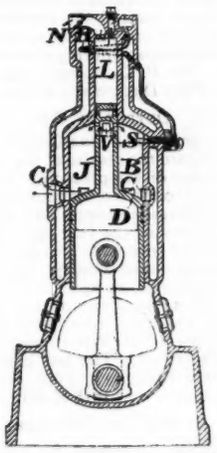
When the valves F, K, O, and R are turned by the chains S to the position shown in fig. 2, the valves O and R are opened so that the container C and chamber G are put into communication with the mains L and P respectively, and the valves F and K are closed, with the result that the liquor is drawn from the hydraulic mains B to the container C, and the dip-pipes A are unsealed, while the level in the chamber G remains the same.

Gas-Engines.—No. 177,214.

Scholes, W. N., and Hall, H. R., of Manchester.

No. 35,087; Dec. 13, 1920.

This invention relates to gas-engines in which the charge is ignited by the heat generated on the compression stroke and to a construction that has been proposed for oil and gas-engines—that is to say, the compression of the gas is effected through the medium of a plunger in the form of an extension of the engine piston working in a jacketed cylinder in axial alignment with the main cylinder; the auxiliary cylinder being furnished with a valve, and the parts of the pump so arranged that the gas is compressed therein before admittance to the power cylinder. The invention is applicable to engines working either on the four-stroke or the two-stroke cycle.



Scholes' and Hall's Gas-Engine.

The two-stroke working is described as follows in connection with the accompanying sectional elevation. It will be seen that each charge of air drawn into the crank-case by the upward movement of the piston D will, on the downward movement thereof, be displaced when the ports V are uncovered at the lower end of the piston's stroke and pass through the ports into the cylinder B, when it will be compressed on the next upward movement of the piston. The downward and upward movements will respectively cause the plunger J to draw a charge of gas into the cylinder L and compress it into the pipe R, whence it will be allowed to flow into the cylinder B by the action of the timing valve S and mix with the compressed air charge therein; the combustion of the mixture being effected by the heat developed by the high compression of the air charge. The piston D will then move downwards in the cylinder, and at the lower end of its stroke will uncover the exhaust outlets C. Any leakage of gas past the rings in the plunger will pass into the cylinder B. It is to be understood that the plunger J is so arranged within the cylinder L that the gas is compressed in the latter to a higher degree than that of the air in the cylinder B, in order that when the timing valve is opened the gas will flow from the pipe R into the main cylinder. A throttle valve in the gas-inlet N is controlled by the usual centrifugal governor.

It will be readily understood that the invention is applicable also to engines of the four-stroke or Otto-cycle type, in which case the auxiliary pump cylinder is fitted with a mechanically operated valve such as S, arranged to open on each alternate up-stroke of the pump piston as well as on the suction stroke, and closed only on every fourth stroke. The advantages of this construction are claimed to be immunity from pre-ignition, and economy in gas consumption due to the fact that a larger volume of air in proportion to gas is obtained owing to the power cylinder being filled with air for each charge instead of a mixture of gas and air.

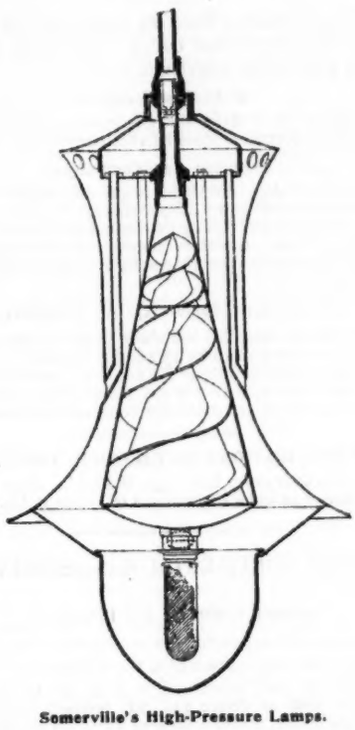
For starting on half compression it is advantageous to use an ignition device such as an electric spark or a firing tube.

Gas Lamps.—No. 177,358.

South Metropolitan Gas Company and Somerville, J. M., of Old Kent Road, S.E.

No. 5892; Feb. 21, 1921.

The main object of this invention is to provide improved means, especially in high-pressure inverted incandescent gas lamps, for imparting a whirling movement to the mixture of gas and air before it reaches the mantle by means of spiral blades arranged on the exterior of a cone. This is effected by interposing between the gas injector and the mantle a conical chamber having two superimposed cones, each provided with one or preferably a plurality of spiral blades; there being at the base of each cone a plate of such diameter as will leave a clearance of (say) half-an-inch between the base and the conical chamber.



Somerville's High-Pressure Lamps.

To effect preheating of the gaseous mixture, the lamp is preferably of the enclosed type. The air for combustion is heated by admitting it to a preheating chamber by a number of tubes carried through the outer casing or tent of the lamp. The gas orifice may conveniently be situated at the end of a venturi tube having a number of small holes of (say) $\frac{1}{16}$ in. dia. The accompanying drawing shows diagrammatically a lamp constructed according to the invention.

Bolton Corporation Bill.

This Bill was recently considered by a Committee of the House of Lords, presided over by the Marquis of Bath. Its provisions (as set out in the "Journal" for Jan. 11, p. 80) remain; and no opposition was directed to them.

Sheet-Iron Flue-Pipe Troubles.

Those who have, says "The Ironmonger," to deal with gas-burning appliances—particularly gas-boilers or any apparatus which cools the products of combustion—will know how much trouble the flue-pipe can give. Galvanizing the pipe is not sufficient protection. Probably it has some effect; but, as a rule, it is not very helpful. Terne plate—lead-coated—has been tried; but it has been found that slight defects in the coating allow the iron to be attacked. Of course, pure-lead pipe would do well; but the cost and difficulty of running are prohibitive. Copper pipe is liable to injury by the sulphur in the gas; but this can be overcome, sufficiently at least, by tinning. At the present price of copper, its use would not be excluded where it is desired to make a lasting job. Great hopes have been entertained of finding a coating material for plain or galvanized iron pipe in the nature of a paint which might be applied without much expense. Various materials have been tried; but acid-laden water defeats them. A paint which serves as well as any can be made up of red and white lead and oil, and air-dried. The seam in the pipe, being the part liable to go first, has to be well filled. The paint must be well rubbed in everywhere, and the seam placed upwards where fixing is done. The best material to use as flue-pipe from a gas-boiler is glazed earthenware drain-pipe. This is water and weather proof, it retains some warmth, resists cold better than metal, and is extremely durable. Its appearance, however, is against it; and it needs to be strongly supported. Of late, pipe and fittings have appeared made of asbestos material finished hard and smooth; and these are now being tried. If the trials are successful, the material will be welcomed.

Finances at St. Anne's.—Referring to financial matters at a meeting of the St. Anne's Urban District Council, Mr. C. F. Critchley (the Chairman) said the question had been asked as to why the Council did not reduce the price of gas. They had not yet got possession of the works, but were expecting to do so shortly. In 1917 the total manufacturing costs of gas were £11,023; while last year they had increased by £5144. It was estimated that the coal strike cost the Company between £4000 and £5000. During the last four years, the manufacturing cost had increased £12,838, but the income was only £4733 more. How was it possible, in such circumstances, to comply with the demand for decreased charges? In the future they would have to consider whether they would supply the whole district of Lytham and St. Anne's from one works or two, or whether they would scrap the lot, and start again on a new and more suitable site.

MISCELLANEOUS NEWS.

GAS REGULATION ACT ORDERS.

There have been received from the Director of Gas Administration copies of the following further Orders made by the Board of Trade under section 1 of the Gas Regulation Act.

Hyde Gas Company.

As from the declared date, the maximum price in respect of gas supplied by the undertakers shall be 16d. per therm. (April 10.)

Paignton Gas Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 13·4d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by five-and-one-half. (April 19.)

Wellington (Somerset) Gas Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 15·4d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by five. (April 15.)

DECLARATIONS OF CALORIFIC VALUE.

Cirencester Gas Company, Ltd.—450 B.Th.U. (July 1.)
Dorchester Gas and Coke Company, Ltd.—450 B.Th.U. (June 30.)

IMPERIAL CONTINENTAL GAS ASSOCIATION.

Annual Report of the Directors.

The following is the report for the year ended Dec. 31 last which will be submitted to the proprietors at the meeting next Tuesday.

The profit for the year amounted to £167,190 16s. 2d., which, together with the sum of £8912 13s. 7d. brought forward from the previous year's account, makes a total of £176,103 9s. 9d. available for appropriation, out of which an interim dividend of 3 p.ct., amounting to £59,279 9s. 9d., was paid (less tax) in November last. The Directors recommend that, in addition to the interim dividend, a final dividend be now declared for the year ended Dec. 31, 1921, at the rate of 7 p.ct. (actual), less income-tax at 6s. in the pound, payable on Monday, May 15, making the total dividend for the year 10 p.ct.

The Association, with the consent of the British Authorities, concluded an agreement with the German Government for the settlement of the whole of the balance of their German claims, by way of compromise, for the sum of £1,600,000, subject to the formal approval of the Mixed Arbitral Tribunal. The sphere of the Association's direct operations is now confined to Belgium, Holland, and Czecho-Slovakia.

The total output of gas in towns supplied by the Association in 1921 was 4726 million c.ft., showing an increase of 5·07 p.ct. on the preceding year. The number of consumers on Dec. 31 was 231,602, or 1·37 p.ct. more than at the close of 1920. The total length of mains laid up to Dec. 31 was 1344 miles, an increase of 6 miles during the year. The quantity of coal carbonized during the year under review was 298,308 metric tons, or 16,291 tons more than in 1920, at an average gross cost per ton delivered on to the works of 38s. 9d., or 4s. 7d. per ton less than in the preceding year. The Droogenbosch electricity works at Brussels sold during 1921 77,322,893 KW.H., as compared with 4,345,862 in 1920, an increase of 2,977,031 KW.H., or 68·5 p.ct.

A contract was signed with the Municipality of Antwerp, by which the Association's exclusive right to supply gas was prolonged by five years—*i.e.*, until 1932. Moreover, supplementary agreements on similar lines were concluded with the majority of the 56 suburban Communes supplied by the Association; the duration of the concession being in some cases extended until 1954. At Brussels prolongations of contract were secured at Anderlecht (gas and electricity) until 1928, and at Auderghem (gas and electricity) until 1954.

At the Berchem works at Antwerp the erection of a new tar-washer was completed, and a waste-heat boiler in connection with the furnaces of the vertical retorts was installed with satisfactory results. A block of small properties, covering about half an acre of land, adjoining the works, was purchased, with a view to future extensions of plant. At the Dam works a steam grab-crane, with the necessary hoppers, was erected to facilitate the unloading of coal; and at Hoboken the foundations of a new retort-house were commenced. The battery of coke-ovens, of a capacity of 1,400,000 c.ft. per diem, erected at the Forest works at Brussels, was put into action, and gave satisfaction; the results guaranteed by the contractors being surpassed. The vertical furnaces at Forest suffered considerably during the war, owing to inundations; and now that this danger is past, they are being thoroughly overhauled. At the Droogenbosch electricity works the installation of a 6000 KW. turbo-generator, and of two additional Babcock and Wilcox boilers, was completed.

The site of one of the Association's dismantled gas-works at Floridsdorf, Vienna, was sold on satisfactory terms. The sale of the Association's premises at No. 21, Austin Friars, for the sum of £250,000, and the acquisition of the freehold of No. 6, London Wall for £30,000, were completed; the removal to the new offices taking place on April 1, 1921.

The Board regret to announce the death, on Jan. 9 last, of Sir Arthur Lucas, who had been a Director since June, 1880. On April 13 last, Mr. Robert William Wilson, who has filled the office of Secretary to the Association since Jan. 1, 1896, retired after 50 years' service. He has been elected by the Board to fill the vacancy caused by the death of Sir Arthur Lucas. The Board have appointed Mr. Frank Henry James, M.A., to be Secretary to the Association.

The Directors who go out of office by rotation are Sir Henry Birchenough, Bart., K.C.M.G., Mr. H. G. Newton, and Colonel H. Le Roy-Lewis, C.B., C.M.G., D.S.O. These gentlemen are eligible for re-election, and offer themselves accordingly. The Auditor who goes out of office is Mr. T. B. Bassett, who is eligible for re-election, and offers himself accordingly.

(Signed) C. J. Jessel,
Chairman.

METROPOLITAN GAS COMPANY OF MELBOURNE.

Half-Yearly Meeting.

The Half-Yearly Meeting of the Company was held on Friday, Jan. 27, in Melbourne—Sir John Grice (the Chairman) presiding.

The Manager and Secretary (Mr. John Hinde) read the notice convening the meeting; and the report and accounts for the six months ended Dec. 31 were taken as read.

The Chairman said that at the last half-yearly meeting the shareholders were informed that the Vice-Chairman, Mr. F. H. Wilson, had been granted by his colleagues leave of absence for six months from the latter part of March, 1921, to enable him to visit England; and, in reply to an inquiry, it was at the same time stated that if he asked for an extension for a further six months it would probably be granted. Such a request was made, and granted by the Board. Mr. Wilson, however, finding that he was unlikely to return to Australia during the present year, resigned shortly after the commencement of his extended leave. Mr. Wilson's abilities as a business man were such as to render him of great assistance in the management of the undertaking; and the Directors desired the shareholders, by the adoption of this report, to place on record their appreciation of the valuable services he rendered to the Company during the period of eleven years that he was on the Board. Mr. P. C. Holmes Hunt, who was well known to them, was elected by the Directors to fill the vacancy.

Output of Gas.

In order to show the progress of the Company, it was usual at the January meeting to compare the results of the completed year's operations to Dec. 31 with those of the preceding twelve months. On this occasion, however, owing to the almost continuous strikes either at the coal mines or by the marine engineers and stewards, or by the gas-workers, which occurred during the year 1920, the figures for that year were so seriously interfered with as to prevent any useful comparison. During the twelve months ended Dec. 31, 1921, the total quantity of gas sold was 3451 million c.ft., as against 3111 million c.ft. in 1920, showing an increase of 10·93 p.ct. for the twelve months. The months of January and February, 1921, were also affected by the restrictions on the use of gas which were in operation on account of the stewards' and seamen's strikes. The last completed twelve months unaffected by strikes was 1918; and the quantity of gas sold in the year 1921 showed an increase over 1918 of only 16 million c.ft.

Half-Yearly Figures.

Referring to the half-yearly figures, the total revenue of £746,523 included £602,236 derived from the sale of gas, and £144,279 from the disposal of residual products. The latter figure compared with £133,362 for the December half of 1920; the higher result being entirely due to sales of larger quantities of coke and tar at increased prices, as the return from sulphate of ammonia, owing to the market for this residual having considerably fallen, showed a less return by £18,785 than for the corresponding period of the previous year. The total quantity of coal carbonized during the half year was 154,024 tons, as compared with 127,531 tons in the December half of 1920, an increase of 26,493 tons; but the cost amounted to £292,400, as compared with £224,050, an increase of £68,350. In respect of the item "Sick and accident pay to workmen," this expenditure was consequent upon the agreement entered into with the Union, under which workmen were paid up to ten days in the year for absence from duty owing to personal accident arising in the course of their employment, or to personal ill-health. The regulations governing such absences had been in force since Oct. 3, 1920; but the first completed twelve months, so far as balance-sheets were concerned, ended with the close of the half year now under review. The amount paid to members of the Union for such sick and accident leave for the year to Dec. 31 last totalled £5249. In view of the necessity of being independent as far as possible of obtaining constructional plant from England, workshops had been erected at the Fitzroy works of the Company; and the construction of a holder and other important work had been carried out there. The ordinary work of the Chief Engineer of a gas company of the size of this undertaking always entailed onerous and arduous duties. In addition to these, however, Mr. J. N. Reeson had accepted the full responsibility of organizing and executing all constructional work carried out by the Company in these workshops. The past few years, therefore, had in every way been of an exceptionally trying nature; and the Board had recognized the additional responsibility thus thrown upon Mr. Reeson, and willingly accepted by him, by adding to the title of "Engineer-in-Chief" that of "Technical Adviser" to the Company. The erection of the No. 3 unit of the Woodall-Duckham carbonizing plant at the West Melbourne works had been completed, and would be ready for next winter's work. It would be necessary, in all probability, soon to proceed with the fourth unit of this plant, with additional condensing, washing, and purifying apparatus. The Directors, while glad that they had been able to preserve the continuity of the dividend during the last few years, desired to point out that, on account of the enormous increases in the costs, both in respect of wages and materials, together with the effect on the consumption of gas of the repeated industrial disturbances, they had only been able to do this at the expense of the reserve fund and by a reduction of the carry-forward.

The report was adopted; and a dividend of 6s. 6d. per share was declared out of the profits of the half year.

LIVERPOOL LIGHTING ENGINEER'S REPORT.

In his report upon the work of his department for the year 1921, Mr. A. G. Smith, the City Lighting Engineer of Liverpool, says that the total length of roads equipped for lighting at the end of the year, irrespective of courts and passages, amounted to 510⅝ miles—10⅜ miles by electricity, 495¾ miles by incandescent gas, and 4¾ miles by oil. This is a net increase of 7 miles, due in a large measure to the lighting of the roads on the various housing estates, all of which has been carried out at the expense of the Housing Committee. Of the 20,140 gas-lamps fixed, 12,512 are in the old city, and 7628 in the suburbs; but some of these were not in commission. The fixing of inverted burners in lieu of the upright type is proceeding at a satisfactory rate, approximately 6000 lamps having been converted. This system of lighting is proving very effective, resulting, as it does, in increased illumination and decreased maintenance charges.

GAS-METER TESTING.

Under the Gas Regulation Act, 1920, alterations have been made in the regulations governing gas-meter testing; and under an Order of the Board of Trade, the following new scale of fees came into operation on Jan. 1:

	s.	d.
For all meters with a measuring capacity up to 50 c.ft. per hour (as indicated on the meter by the maker) .	1	0
For each additional 100 c.ft., or part thereof, in the case of a dry meter	0	6
Or in the case of a wet meter	0	9

The number of meters tested was the highest on record—viz., 21,331—the fees for which amounted to £1218 9s. 9d. The following are the details, compared with the totals for 1920:

Senders.	Dry Meters.		Wet Meters.		Prepayment Meters.		Total.	Fees.		
	Approved	Rejected	Approved	Rejected	Approved	Rejected		£	s.	d.
Liverpool Gas Company . .	223	16	7086	124	2,827	171	10,457	568	12	0
Meter manufacturers . . .	1975	138	2	1	5,946	434	8,496	511	12	9
Local authorities	1	30	556	23	82	18	710	41	17	3
Sundries . . .	47	265	44	9	1,217	86	1,668	96	7	9
Totals for 1921 .	2256	449	7688	157	10,072	709	21,331	£1218	9	9
Totals for 1920	2148	415	6057	158	10,426	647	19,851	£601	1	0

All the holders used for testing gas-meters were re-verified by the Board of Trade in July, and will therefore be regarded as accurate instruments for the next ten years.

GAS TESTING.

During the year, the regulations governing gas testing have been subject to much change; and Mr. Smith states briefly the changes that have taken place. Both the Liverpool and the Woolton Gas Companies have taken advantage of the provisions of the Gas Regulation Act. The Liverpool Company have been supplying on a calorific basis since 1914; but on Sept. 8, 1921, they obtained an Order from the Board of Trade, under which the declared calorific value was 475 B.Th.U.; and since that date the standard has been maintained. Their standard price under the 1914 Act was 2s. 1d. per 1000 c.ft.; but under the new Order it is now 12·4d. per therm, with a neutral zone of 0·06d., making the maximum price 13d. per therm, which was the figure charged to the end of the year, subject to a rebate of 10 p.ct. for street lighting. The Woolton Gas Company have hitherto been under an illuminating power standard of 16 candles, with a maximum charge of 5s. 6d. per 1000 c.ft. They also have obtained an Order from the Board of Trade to supply gas under a calorific standard, which has been declared at 470 B.Th.U.; the maximum price per therm being fixed at 21·8d. The actual charge from July 1 was 21d. per therm for ordinary consumers and 19d. for street lighting.

Under the Gas Regulation Act, the Board of Trade have appointed three persons to act as Gas Referees, who will prescribe the places and times at which, and the apparatus and method by which, tests shall be made to ascertain whether undertakings are supplying gas in accordance with their obligations; the time and form of the reports to be made by the gas examiner to the Gas Referees and undertakers, and the means by which the results of the tests shall be made available to the public. The prescriptions for Liverpool have not yet been issued; and in the meantime, by arrangement with the Gas Referees and both Companies, the testing of the gas at the six manufacturing stations of the Liverpool Company and one at Woolton is being carried on as heretofore. The result of each test is forwarded to the respective Companies, and quarterly returns are rendered to the Gas Referees.

GAS-FITTING WORK IN CORPORATION ESTABLISHMENTS.

This work is one of the activities of the department, involving the maintenance of the gas supply and fittings in the majority of the numerous establishments under control of the various Committees, including over 6000 incandescent burners in schools and hospitals.

EXPENDITURE.

The total charges in connection with the public lighting of the city, and the supervision of the gas supply, for the year, amounted to £98,625 6s. 2d. A revenue of £8419 10s. 2d. has been derived from work charged to other departments and bodies, making the net expenditure £90,205 16s.

The Directors of the Oriental Gas Company, Ltd., have resolved to pay, on May 31, an interim dividend at the usual rate of 3 p.ct., less income-tax, on account of the year ending on June 30 next.

GAS-WORKS LOAN FOR BURNLEY.

Additional Storage Needed.

Mr. A. W. Brightmore, on behalf of the Ministry of Health, held an inquiry last Wednesday into an application by the Burnley Corporation for sanction to borrow £80,000 for gas-works purposes.

The Town Clerk said the Corporation obtained sanction in 1919 to secure 26 acres of land at Old Hall; and the application for the £80,000 would have been made then, but that it was considered undesirable, owing to the fluctuations in prices and other economic conditions, to fix any amount at that time for work which was not to be carried out for two or three years. The Corporation as long ago as 1914 made arrangements for the land. The work which formed the subject of the inquiry was part of a larger scheme for the provision of new gas-works on the same site. They had been advised by their Engineer that it was no longer wise to postpone the provision of additional storage accommodation. The deficiency in holder capacity had on occasion forced the department to supply gas direct from the works to the consumers. At present, in spite of the abnormal depression of the staple industry, the consumption of gas showed an increase; and it was anticipated that when there was a trade revival the plant for gas making, when taxed to its utmost capacity, would not be sufficient unless further storage facilities were provided.

Evidence bearing-out the Town Clerk's statement was given by Mr. J. P. Leather (the Gas Engineer) and Alderman H. Emmott, J.P. (the Chairman of the Gas Committee).

HAYWARDS HEATH DISTRICT GAS COMPANY.

Mr. E. C. Charleton (the Chairman), addressing the shareholders at the annual general meeting of the Company, said that during the miners' strike it had been necessary to purchase foreign coal at from £5 to £6 per ton; but through the Company's efforts during this unprecedented period, the consumers were not at any time deprived of a full supply of gas, nor was there any advance in the price—a fact of which they might well be proud. In the past year, as compared with 1920, there had been a substantial increase of 10·69 p.ct. in the sale of gas; while another satisfactory feature was the large increase obtained from the rental of meters and fittings. The financial position of the Company had been strengthened by the addition of a further £500 to the contingency account and £1000 to the repairs suspense account. The profit shown after these deductions had been made was about £150 more than for the previous year; and the position of the Company warranted the recommendation of a dividend making 4½ p.ct. for the year (less income-tax), which would leave £1613 to be carried forward. Under their Order, the Company would supply gas of 425 B.Th.U. By their Act of 1914 they were empowered to issue £45,000 of capital upon certain terms, for the purpose of modernizing the works and increasing the area of supply. The advent of the war precluded their making any issue; but nevertheless the Directors did not remain idle, and considerable additions had been made to the works. They were now anxious to make further extensions, which were being carefully considered with a view to improving the position of the Company; and to this end application had been made to, and granted by, the Board of Trade to issue £20,000 of either redeemable debenture or preference stock. An invitation was issued last year to the consumers to come and voice their complaints (if any) at the shareholders' meeting. It did not surprise him in the least to notice that no one had accepted the invitation. He was in close personal touch with the works and district last year, as well as in previous years, and was glad to state that the unfailing courtesy of the Engineer (Mr. Alec E. Whitcher) and his staff, and the admirable quality of gas supplied, had led to the happy position which they all desired—viz., that of giving satisfaction to their customers.

The report was adopted, and the dividend declared.

Protest Against Increased Cost of Lighting.—The Chairman of the Highway Committee presented a report to the Holywell Urban Council last week relative to an application of the British Gas Light Company under the Gas Regulation Act. It stated that since the inquiry an Order had been made fixing the maximum price per therm at 1s. 7d., in place of 1s. 9½d. asked for by the Company, who had given notice that the calorific value of the gas which they intended to supply in respect of their Holywell undertaking was 510 B.Th.U., and that the date from which they would supply gas of this value was March 22 last. It was resolved that a strong protest be made against any increased charge for gas at the present time; that the Council do not agree to any increased price for public lighting, and that the matter be left in the hands of the Chairman of the Lighting Committee and the Clerk. The recommendations were confirmed.

Congleton Gas-Works Extension.—Reference was made to the proposed extension of the gas-works and the erection of a new holder, at a meeting of the Congleton Gas Committee last week, when Alderman Solly said there was some feeling among the residents in the locality where it was intended the holder should be erected. The Committee were informed by the Gas Manager (Mr. W. A. Cartledge) and the Consulting Engineer (Mr. W. Newbigging) that this was the only practicable site. If the proposed extension were not carried out, they would be without gas next winter. One of the complaints went so far as to suggest that the Corporation were not legally bound to provide gas for industrial purposes. One-quarter of their consumption was for industrial gas; and if the Corporation refused to supply this to the engines in the mills, the probability was that most of these owners, if they found such treatment meted out to them, would move their industries elsewhere. The Chairman said he thought it would be cheaper for the Corporation to buy the houses which would be mostly affected than to place the holder on any of the alternative sites. It was eventually decided that the Committee should inspect the alternative sites suggested.

CURRENT SALES OF GAS PRODUCTS.

Tar Products in the Provinces.

April 24.

The average values for gas-works products during last week were: Gas-works coal tar, 35s. 6d. to 40s. 6d. Pitch, East Coast, 72s. 6d. to 75s. f.o.b. West Coast—Manchester, 67s. 6d. to 70s.; Liverpool, 67s. 6d. to 70s.; Clyde, 70s. to 72s. 6d. Benzole 90 p.ct. North, 2s. 1d. to 2s. 2d.; crude 65 p.ct. at 120° C., 1s. 5d. to 1s. 7d. naked at makers' works; 50-90 p.ct., naked, North, 2s. 1d. to 2s. 2d. Toluole, naked, North, 2s. 2d. to 2s. 5d. nominal. Coal tar crude naphtha in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 2s. 2d. to 2s. 4d. Heavy naphtha, North, 2s. 1d. to 2s. 3d. Creosote, in bulk, North, liquid, 4¼d. to 4½d.; salty, 3⅝d. to 4¼d. Scotland, 3⅝d. to 4d. Heavy oils, in bulk, North, 6d. to 6¼d. Carbolic acid, 60 p.ct., 1s. 10d. to 2s. Naphthalene, £12 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 5d. to 6d. per minimum 40 p.ct.; "B" unsaleable.

FROM A MARKET CORRESPONDENT.

Bye-Products Trade.

There has been very little doing since the last report; and there are practically no price alterations to be noted. Pitch remains steady, and there are some indications that the demand for road-making and repairing purposes is now coming forward. Solvent naphtha can now be purchased at varying prices, according to district. These range from 2s. 1d. to 2s. 6d. per gallon. Naphthalene is a poor trade. Crude is only worth £5 to £7 per ton; the refined still remaining at £15 to £17. Carbolic acid continues a depressed market, at 1s. 6d. per gallon for crude 60's, while 40 p.ct. crystals are selling at 5½d. per lb. There is a moderate demand for cresylic acid at 2s. 3d. per gallon, and creosote remains quiet at 5d. to 5¼d. per gallon. There have been offers at less, and a quotation of 4½d. per gallon has been rumoured, but not confirmed. In intermediate products, there has been a small amount of business on both home and export account; and the outlook seems rather better than of late. There is no change in quotations.

Sulphate of Ammonia.

There is not much change in the position of this fertilizer. The demand is still large, and the quantity available is gradually diminishing. A very fair export trade continues; a slight increase being shown in the March returns over those of February. During March, 12,868 tons were exported, having a value of £21,454; a year ago 18,619 tons were exported. France is once again the largest consumer, having taken 8959 tons, compared with 6574 tons in February, and 10,813 tons in March of last year. Japan was not in our market during March. This country has been able to meet most of her requirements in America when prices were comparatively cheap. The trade in the British West Indies has shown further improvement, though only 350 tons were sent there, compared with some 50 tons in the previous month. Spain and the Canaries took 537 tons, which is about 100 tons less than during February, and which shows a heavy falling off when contrasted with 5043 tons in March of 1921. The Dutch East Indies purchased only 359 tons, compared with 2555 tons in February and over 1000 tons a year ago. The total quantity exported during the first quarter of this year is about one-quarter less than during the corresponding period of last year, and the value just about one-half. From America it is reported that the shortage of sulphate of ammonia is more acute than ever, and exceptionally high prices are being paid for such small parcels as are available in that market.

Nottingham Gas Prices.—Satisfaction is felt in Nottingham with the announcement of the intention of the Gas Committee to reduce charges by at least 4d. per 1000 c.ft.; this intimation being accompanied by the information, following a meeting on Friday, that the reduction may even be larger. For ordinary illuminating purposes, where the quantity supplied is under a million c.ft. a quarter, consumers are at present charged 4s. 6d. per 1000 c.ft.; and for power purposes, under 100,000 c.ft. a quarter, 3s. 11d. Having regard to the revenue-earning capacity of the undertaking, it has been suggested in the city that the reduction now proposed has been long overdue, and that, while a commendably sound policy has been followed of endeavouring to secure a profit proportionate to the capital involved, the leaning has rather been too greatly in the direction of amassing reserve funds, to the exclusion sometimes of equitable considerations which should operate in the interest of consumers. The reduction in price in regard to supplies of gas for power purposes will be specially acceptable to manufacturers, in the present generally depressed condition of local industries.

Drogheda Gas Undertaking.—Reviewing the financial position of the Drogheda Corporation, Alderman Fronabam (the Mayor) said that a new item on the revenue account was a sum of £1800 from the gas-works. This was, he thought, the first time in the history of the Corporation that the Gas Department had contributed to relief of rates; but he recalled that only two years ago the Council had to provide £3600 to place the gas accounts to credit. They should not assume that the gas-works were in a very flourishing condition; but they were in a good working state. During the past two years they received prices for gas which they could not hope to continue. At one period they were charging 9s. 2d. per 1000 c.ft.; and now the price was 7s. 6d., at which the department continued to show a credit balance. But several large consumers had replaced gas by electricity; and if this continued, a serious problem would have to be faced, because they were liable for £1000 annually to pay off loan charges. It certainly would be necessary to produce gas at a much lower price than obtained at the moment; and the Gas Committee would shortly submit a plan for the modernization of the gas plant, so as to enable them to compete with electricity.

TRADE NOTES.

"A. & M." Controllers.

Consequent upon the continued success of the "A. & M." patent pressure-wave automatic controllers fitted some time ago, the Blyth Urban District Council have now decided to instal an additional one hundred controllers. The Leeds Corporation have decided to increase their installation by another 250.

Underfeed Stoker Company.

The following is a list of the more important orders recently received by the Underfeed Stoker Company, Ltd., of Coventry House, South Place, London, E.C.: The Eastbourne, Marylebone, Wolverhampton, Stafford, Liège, and Cossipore (India) electricity undertakings, for travelling grate stokers. The Harworth Main Colliery, Consett Iron Works, Scottish Oils, Ltd., Great Mountain Colliery, and Stockholm Gas-Works, also for travelling grates. The Steel Company of Scotland and Messrs. Tate and Lyle, for underfeed stokers. The Borough of St. Pancras and Philadelphia Colliery, for ash conveyors.

"Shell Brand" Paint.

It is stated that 75 p.ct. of gas engineers in Scotland have used "Shell Brand" red oxide exclusively on their gasholders for the past quarter-of-a-century, which is conclusive evidence of its efficiency as a preservative. "Shell Brand" pure red oxide paint is non-poisonous, and is unaffected by the action of sulphuretted hydrogen and other gases. It affords an impervious protective film at a cost which, considering its durability and covering capacity, is extremely low. Messrs. Archd. H. Hamilton & Co., of No. 12, Possilpark, Glasgow, the makers of "Shell Brand" pure paints, guarantee their purity. "Negro Swift" cooker black, made by the same firm, for the renovation of used cookers, is a black of extreme density, and is supplied either in egg-shell or glossy finish. It is now packed in handy crates containing 4 gallons, which is found to be a good average quantity to purchase at one time.

A Reduction at Oxford.—As from the Midsummer reading of the meters, the Oxford Gas Light and Coke Company are reducing the price of gas to 10d. per therm within the city, and 11·2d. per therm outside the city boundary.

Blackpool Gas-Works Results.—Consequent upon the coal strike, the Blackpool Gas-Works did not achieve a record for the year ended March, 1922. From April to July there was a reduction in output of 16 million c.ft. (or 7¼ p.ct.) compared with the previous year. Mr. W. Chew (the Gas Engineer) reported that the decreased output for the whole year was 5 million c.ft., or only 0·60 p.ct. The make for the year was 827 million c.ft., as compared with 588 millions ten years ago and 458 millions twenty years ago.

Reduced Price at Huddersfield.—At the last meeting of the Huddersfield Corporation Gas Committee, the Engineer and General Manager (Mr. H. Singleton) reported that the production of gas for the twelve months ended March 31 was 1,243,236,000 c.ft., which was a decrease of 31,500,000 c.ft. on the previous year's production, owing mainly to the restrictions during the coal strike. The price charged for gas was reduced to 3s. 6d. per 1000 c.ft., less a rebate for quantities, and the usual 5 p.ct. discount on payment of the account. The charges for the hire of cookers in the area previously supplied by the Longwood and Slaithwaite Gas Company were also reduced to the same rates as those prevailing within the borough.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for April 20.]

Nos. 10,103 to 10,719.

Benson, M.—"Combined gas and steam turbine installations." No. 10,712.

Blyth, C. E.—"Apparatus for separating air or gas from material suspended therein." No. 10,575.

Brooke, R. M.—"Mechanism for extracting coke from vertical gas-retorts." No. 10,418.

Constantinesco, G.—"Producing mixtures of liquids and gases." No. 10,697.

Elias, O. A.—"Treatment of liquids with gases." No. 10,166.

Evetts, W. A.—"Calorimeter slide-rule." No. 10,293.

Figg, T.—"Atmospheric gas-burner." No. 10,463.

Hartley, E.—"Means for joining or coupling pipe tube lengths." No. 10,253.

Jeffries, W.—"Drilling-apparatus for water and gas mains." No. 10,291.

Johnston, J. B.—"Heater for domestic hot-water supply." No. 10,446.

Keith, G.—"Rotary ovens." No. 10,294.

Keith, G.—"Ovens, &c." No. 10,295.

Keith & Blackman Co., Ltd., J.—See Keith, G. Nos. 10,294-5.

Landis & Gyr Akt.-Ges.—"Prepayment meters for gas, &c." No. 10,348

Mueller, M. E.—"Method of recovering hydrocyanic acid from gases." No. 10,174.

Page, J. H.—"Case for geysers, &c." No. 10,433.

Peck, W. J.—"Gas-burners for cooking, &c." No. 10,263.

Peebles, W. C.—"Prepayment meters." No. 10,616.

Simpson, S.—"Coin-freed mechanism for gas, &c., meters." No. 10,128.

Smith, W.—"Automatic gas control gear." No. 10,135.

Soc. l'Air Liquide (Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude).—"Cooling gases." No. 10,551.

Southon, J. C.—"Gas-meters." No. 10,206.

Techno-Chemical Laboratories, Ltd.—"Recovery of heat from treated material." No. 10,528.

Whitworth, W.—See Brooke, R. M. No. 10,418.

Darwen Gas-Works Finances.—At a meeting of the heads of Corporation departments at Darwen on Monday afternoon, it was decided to reduce the total rates by 4d. in the pound to 13s. It was reported that there was a loss on the gas-works of something like £3000.

A Bogus Gas Inspector.—Birmingham citizens have been misled by a bogus gas inspector, who has been in the habit of visiting houses, and on the strength of the one word "Gas," which he utters in an authoritative way, has been allowed the "run" of some of the houses. Theft is alleged against him. Though not wearing a uniform, he has donned a peak cap bearing on the front a round metal disc resembling the badges worn by official inspectors of the Birmingham Gas Department.

Unsatisfactory Gas-Fittings.—An open verdict was returned by the Liverpool Coroner in the case of Ethel Westhead, aged 34, who died from coal gas poisoning, there being no evidence to show how the gas in her room came to be turned on. He added that there was no suggestion of suicide. Miss Westhead was found dead in her bedroom. The gas was turned full on and unlighted, the window closed, and the firegrate covered. The firegrate had usually been covered to prevent draughts. Points in the evidence at the inquest were that the gas-fittings in the house were generally in a bad state; and the looseness of the gas-tap in question was such that in turning it off Miss Westhead may have unwittingly knocked it open again.

Accidental Gas Poisoning at Leeds.—Verdicts of "Accidental death" were returned at inquests at Leeds last week on the bodies of Mr. and Mrs. Charles William Dumont, and of Mr. Joseph Harindel, aged 78. Mr. and Mrs. Dumont were a middle-aged couple who were in the habit of going away to relatives at week-ends; and though they died apparently on the Saturday, they were not discovered until Wednesday night. They were found dead in bed; the gas being on. The tap was loose, and had probably been turned on accidentally after the light was extinguished. There was no suspicion of suicide. In the case of old Mr. Harindel, there appeared to have been a similar mishap. His wife was unconscious, but recovered. The man had been in failing health; and muscular disease of the heart was aggravated by coal-gas poisoning, causing death.

Tarred Roads and Fisheries.—The Ministry of Transport announce that the Joint Departmental Committee appointed by the Ministries of Transport and Agriculture to consider the question of damage to fisheries by tar pollution, caused by rain washings from the roads, have recently presented an interim report, which will shortly be published. The report states that the results of investigations at a special experimental station at Alresford, in Hampshire, suggest that the rain washings from a tar-treated road have their maximum toxic effect on fish at two periods: (1) When the road has been recently tarred; and (2) when the road surface is in process of disintegration. The Committee consider that Highway Authorities should give a preference to asphaltic bitumen free from tar products for the treatment of roads draining directly into fishing waters.

Price of Gas at Stafford.—In moving the adoption of the Gas Committee's report at the Stafford Town Council meeting last week, Alderman Young mentioned that a decrease in the price of gas would take effect from April 1; but he was not able to state definitely what the reduced price would be until the next meeting. Mr. Hindle urged that there was need for the price of gas to be revised in the case of the slot-meter users, as well as the quarterly consumers. He would like to see £500 of the profits devoted to this end. Alderman Young replied that the slot-meter users would be considered when the time was opportune; and he pointed out that they were not affected by the last increase in price.

Foundry Trades Exhibition.—The Duke of York has promised to visit the Foundry Trades Exhibition which is to be held at Bingley Hall, Birmingham, on June 20 to 23. It has been organized by the Institution of British Foundrymen, which will then be meeting in conference in Birmingham; and simultaneously the Institution of Automobile Engineers and the Municipal Electrical Association will also be holding conferences in that city. This exhibition of the foundry trades, which will have much interest for the gas industry, is the first of its kind ever held in Europe; and in it the British Cast-Iron Research Association are taking considerable interest. The largest single town foundry area is Birmingham, with 118 foundries; and the largest single county foundry area is Yorkshire, with 408. There are nearly 3000 iron foundries in Great Britain and Ireland, and since the war a serious effort has been made to bring science into closer relationship with the industry. This is the outcome of our war experiences, for it was discovered that many of the foundries were wholly out-of-date in their methods.

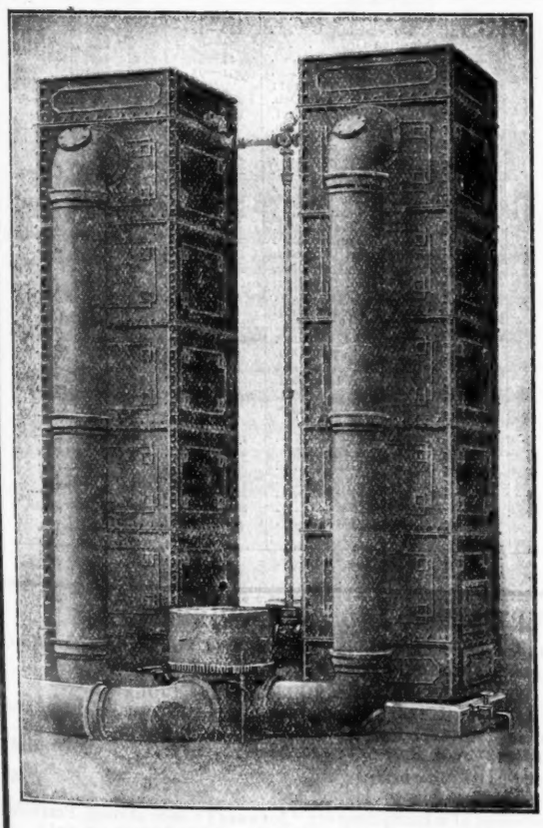
A sum of £30,000 has been voted by the Gas Committee towards the reduction of the district rate at Nottingham.

The Hebden Bridge District Council have decided to apply to the Ministry of Health for sanction to borrow £900, the estimated cost of converting the public gas lighting system to the automatic control method.

Sixty full-paid shares in the Oswestry Gas Light and Coke Company were recently offered for sale by public auction at Oswestry. The bidding rose from £18 10s. to £19 7s. 6d. per £10 share, when the shares were withdrawn from sale.

Mr. A. V. Hendrickson, Chemist to the South Suburban Gas Company, lectured on "The Chemistry of Gas Manufacture," before the Croydon Scientific Society, last Thursday. The lecture, which was illustrated by numerous lantern slides, was well received.

The issue made by Messrs. A. & W. Richards of £15,500 of 6½ p.ct. redeemable debenture stock for the Littlehampton Gas Company, to which reference was made in the "JOURNAL" a fortnight ago, was considerably more than twice subscribed. Tenders ranged from £102 10s. p.ct. down to the minimum of par; and the lowest price at which any stock was allotted was £100 5s.



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STOCK MARKET REPORT.

The Stock Exchange re-opened on Tuesday in cheerful mood, and almost every market was strong. On Wednesday, however, there was a phase of profit-snatching, which lowered prices. Next day brought a recovery, and fresh record values were scored, especially in Home Government issues, and the buoyancy lasted till the close. The big four's figures on Friday were: Consols 59½-60½, War Loan 101-102, Funding 87½-87¾, Victory 89⅜-89⅝.

Business in the Gas Market was quite active, though the three big companies had the lion's share of it to themselves. The tone was very cheerful, and the upward movement in values which has ruled now for several weeks past continued, though the big strides with which we are familiar were not so numerous. In the London Companies, Gas Light ordinary gave way 1, but the preference rose 3 and the debenture 2, South Metropolitan rose 3, ditto debenture 2, Commercial 4 p.ct. and 3½ p.ct. rose 2 each, and ditto debenture 4. In the Suburban and Provincial group, Brentford "A" and "B" rose 1 each, British 1, Newcastle 3, ditto debenture ½, and South Suburban 1. Continental undertakings were in great form, Imperial rising 5, European ½, Union 10½, and ditto preference 13. In the remoter world, Malta and Mediterranean rose ¼, and Monte Video 3.

Bargains done for cash during the week were as follows: On Monday, *nil*; the House being closed. On Tuesday, Alliance and Dublin 64⅛, 64¼, 65, 65½, Brighton and Hove original 154, Brentford "B" 90, Commercial 4 p.ct. 91, Gas Light ordinary 90½, 90¾, 91, 91¼, 91½, 92, ditto maximum 61¾, 63, ditto preference 78½, Imperial Continental 162½, 164½, 165½, 166, Oriental 87½, Primitiva 13s. 9d., ditto preference 52s. 6d., South Metropolitan 93, 93½, 94, 95, 96, ditto 6½ p.ct. debenture 106, South Suburban 93, Tottenham "B" 88, Liverpool 7 p.ct. preference 105, 106, Southgate 7 p.ct. maximum 107½, 108, Swansea 7 p.ct. preference 102½, ditto 6½ p.ct. debenture 104¼. On Wednesday, Alliance and Dublin 65½, Brentford "B" 91, Brighton and Hove original 154, Commercial 4 p.ct. 89, Gas Light ordinary 89⅜, 89⅝, 89⅞, 90, 90⅛, 90⅜, ditto preference 78½, ditto debenture 58, 59, 60, Imperial Continental 165, 166, 166½, 167, Primitiva 16s. 3d, 16s. 6d., South Metropolitan 95, 96, ditto 6½ p.ct. debenture 104, Swansea 7 p.ct. preference 102½. On Thursday, British 28½, Commercial 4 p.ct. 90, 90¼, ditto 3½ p.ct. 90⅜, ditto debenture 58, European 11⅛, 11⅛, 11⅜, 11 13/16, Gas Light ordinary 89, 89⅛, 89¼, 89⅜, 90, 90⅛, ditto preference 80⅛, ditto debenture 59¼, 60, Imperial Continental 166½, 166⅝, 166¾, 167, 167⅛, 168, 168⅛, 169, 169½, ditto debenture 75, Newcastle debenture 66½, Primitiva 16s. 9d., ditto preference 52s. 6d., ditto 1911 debenture 57½, South Metropolitan 95, 95½, 96, ditto debenture 58½, ditto 6½ p.ct. debenture 104, 104½, South Suburban 95, Tottenham "B" 90, Swansea 7 p.ct. preference 102, 102½, 102¾, Monte Video 5 p.ct. debenture 70. On Friday, Aldershot preference 70, 70½, Alliance and Dublin 65½, British 30, Commercial 4 p.ct. 90, Continental Union 50, ditto preference 50, European 11⅛, 11¼, 11⅜, Gas Light ordinary 89½, 89⅝, 89⅞, 90, 90¼, ditto preference 80½, 81½, ditto debenture 60, 60⅝, Imperial Continental 164½, 168½, 169, 169½, 170, 171, Liverpool 90⅛, Primitiva preference 33s., South Metropolitan 95½, 96, ditto debenture 60½, ditto 6½ p.ct. debenture 103½, Swansea 7 p.ct. preference 102½, 102¾, ditto 6½ p.ct. debenture 105⅜, Metropolitan of Melbourne shares 6⅜.

In the Money Market, rates were at first quite firm—there being a fairly strong demand; but, upon supplies coming in, a position of ease was attained which continued to the close. The Bank rate is 4 p.ct., as fixed on the 13th inst.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Shares.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Mch. 15	4	4%	Aldershot 4 p.c. Pref.	..	65—70	70—70½
1,551,868	,,	Apl. 12	2½	3⅛%	Alliance & Dublin Ord.	59—64	62—67*	64⅛—65½
374,000	,,	Jan. 12	4	4%	Do. 4 p.c. Deb.	76—79	55—60	...
280,000	5	Nov. 30	7½	4/-	Bombay, Ltd.	5¼—6¼	4—4¼	...
100,000	5	Feb. 23	16	7½%	Bourne-mouth Gas and Water { 5 p.c.	..	9½—10½	...
383,110	10	,,	7	7%	B 7 p.c.	15—15½	9—10	...
115,000	10	,,	6	6%	Pref. 6 p.c.	13½—14	8—9	...
162,065	—	Dec. 30	—	4%	4 p.c. Deb.	..	65—70	...
992,045	Stk.	Feb. 9	14	56/-	Brentford A Consolid.	261—266	88—93	...
734,920	,,	,,	11	55/-	Do. B New	204—209	88—93	90—91
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	80—85	...
221,400	,,	Dec. 15	4	4%	Do. 4 p.c. Deb.	91—93	68—72	...
214,775	,,	Mch. 15	11	11%	Brighton & Hove Orig.	208—213	154—159	154
244,200	,,	,,	8	8%	Do. A Ord. Stk.	154—159	110—120	...
1,287,500	Stk.	July 28	5	5%	Bristol 5 p.c. max.	..	..	...
530,000	20	Mch. 15	12½	10%	British	44—45	28—30	28½
120,000	Stk.	Dec. 30	4	4%	Do. 4 p.c. Deb. Stk.	88—90	68—72	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	55—60	...
100,000	10	May 27	—	6%	Cape Town & Dis., Ltd.	1½—2½	6—7	...
100,000	10	Oct. 28	—	4½%	Do. 4½ p.c. Pref.	4—6	5—6	...
100,000	Stk.	Dec. 30	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	...
1,513,280	,,	Mch. 15	5/9/4	42/8	Commercial 4 p.c. Stk.	106—108	87—92	89—91
560,000	,,	,,	5⅛	38/4	Do. 3½ p.c. do.	103—105	87—92	90½
475,000	,,	—	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	57—62	58
800,000	,,	Dec. 15	4	—	Continental Union, Ltd.	76—79	28—33	50
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	48—53	50
51,600	,,	Feb. 23	15	15%	Croydon A 10 p.c.	..	185—195	...
278,400	—	,,	12	12%	Croydon B and C 7 p.c.	..	145—155	...
492,270	Stk.	,,	6	4½%	Derby Con. Stk.	123—125	80	...
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	65	...
1,002,180	10	Jan. 26	10	5/0	European, Ltd.	17½—18	11—12	11½—11⅞
16,298,975	Stk.	Feb. 23	4/17/4	46/8	Gas Light and Coke { 4 p.c. Ord	98—102	89—91	89½—91
2,600,000	,,	,,	3½	35/-	3½ p.c. max.	76—79	61—64	61½—63
4,062,235	,,	,,	4	4%	4 p.c. Con. Pref.	96—99	78—83	78½—81½
4,674,850	,,	Dec. 15	3	3%	3 p.c. Con. Deb.	72½—74½	57—62	58—60½
130,000	,,	Dec. 11	10	10%	10 p.c. Bonds	..	..	...
82,500	,,	Sept. 14	5	3½%	Hastings & St. L. 5 p.c.	..	..	...
258,740	,,	Mch. 15	3½	2½%	Do. 3½ p.c.	87—89	45—55	...
70,000	10	May 12	11	5%	Hongkong & China, Ltd.	16½—16¾	5¾—6¼	...
86,600	Stk.	Mch. 15	9	9½%	Hornsey 7 p.c.	..	100—105	...
131,000	,,	,,	7	7½%	Ilford A and C	151—154	110—120	...
65,780	,,	,,	6¾	5½%	Do. B.	115—118	96—101	...
65,500	,,	Dec. 30	4	4%	Do. 4 p.c. Deb.	92—94	65—70	...
1,976,000	,,	Oct. 28	9	5%	Imperial Continental	150—160	167—172	162½—171
404,800	,,	Feb. 9	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	72—77	75
235,242	,,	Mch. 15	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	83—88	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord. { A.	211—213	..	90½
					{ B.	146—148	..	...
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	..	...
165,736	,,	Feb. 23	7/5/6	6%	Maidstone 5 p.c.	..	53—55	...
63,480	,,	Dec. 30	—	3%	Do. 3 p.c. Deb	..	48—51	...
75,000	5	June 11	6	3%	Malta & Mediterranean	4⅛—4½	2¾—3¼	...
250,000	100	Apl. 3	4½	4½%	Met. of Melbourne { 4½ p.c. Deb.	99—101	91—98*	...
541,920	Stk.	Nov. 30	4	4%	Monte Video, Ltd.	11½—12	61—66	...
1,875,892	,,	Feb. 23	4½	4½%	Newcastle & Gatsh'dCon.	98½—99½	74—76	...
529,705	,,	Dec. 30	3½	3½%	Do. 3½ p.c. Deb.	82—83	66—67	66½
15,000	10	Aug. 26	—	7/6	North Middlesex 10 p.c.	..	12½—13	...
55,940	10	Mch. 15	7/14/0	10/1⅛	,, ,, 7 p.c.	14—15	10—11	...
300,000	Stk.	Dec. 15	8	8%	Oriental, Ltd.	117—122	85—88	87½
60,000	5	—	10	—	Ottoman, Ltd.	7¼—7¾	2—3	...
188,120	Stk.	Dec. 30	—	6%	Plym'th & Stonh'se 5 p.c.	..	69—71	...
60,000	50	Mch. 15	13	62/6	Portsea Island, B	128—131	87—90	...
100,000	50	,,	12	57/6	Do. C	118—121	78—83	...
249,980	5	—	8	—	Primitiva Ord.	5¼—6	⅛—¼	13/9—16/9
499,960	5	—	5	—	Do. 5 p.c. Pref.	4¼—5	2¼—2½	33/—32/6
521,600	100	Dec. 1	4	4%	Do. 4 p.c. Deb.	91—93	70—75	...
600,000	Stk.	Jan. 26	4	4%	Do. ,, ,, 1911	..	55—60	57½
346,198	,,	Dec. 30	4	4%	River Plate 4 p.c. Deb.	85—87	55—60	...
150,000	10	Mch. 30	6	6/-	San Paulo { 6 p.c. Pref.	10¾—11	5¾—6¼	...
125,000	50	Jan. 3	5	5%	5 p.c. Deb.	47—49	36—39	...
135,000	Stk.	Mch. 15	10	5%	Sheffield A	223—224	89—92	...
209,984	,,	,,	10	5%	Do. B	222—224	89—92	...
523,500	,,	,,	10	5%	Do. C	220—222	89—92	...
133,201	Stk.	Sept. 15	4	4%	Shrewsbury 5 p.c.	..	..	...
90,000	10	Oct. 28	9	8%	South African	10¼—11½	7—9	...
6,609,895	Stk.	Feb. 9	5/4/0	5%	South Met. Ord.	111—113	95—98	93—96
250,000	,,	Jan. 12	—	5%	Do. Red. Pref.	..	96—98	...
1,895,445	,,	,,	3	3%	Do. 3 p.c. Deb.	72½—74½	57—62	58½—60½
224,820	,,	Feb. 23	8½	8½%	South Shields Con. Stk.	157—159	106—108	...
1,087,795	,,	,,	6	5½%	S'th Suburb'n Ord. 5 p.c.	114—116	93—98	93—95
368,837	,,	Dec. 30	5	5%	Do. 5 p.c. Deb. Stk.	116—118	78—83	...
647,740	,,	Nov. 16	5	4%	Southampton Ord.	99—102	61—64	...
121,275	,,	Dec. 30	4	4%	Do. 4 p.c. Deb. Stk.	..	60—62	...
120,000	,,	Feb. 23	—	7½%	Tottenham { A 5 p.c.	135—138	95—100	...
782,275	,,	,,	6	5½%	District { B 3½ p.c.	115—117	85—90	88—90
181,255	,,	Dec. 15	4	4%	{ 4 p.c. Deb.	87—89	68—72	...
182,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	...
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	...
236,476	Stk.	Mch. 15	5	3½%	Tynemouth 5 p.c. max.	108¼—109	68—70	...
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Mch. 15	8½	66/3	Wandsworth A 5 p.c.	151—156	82—84	...
255,636	,,	,,	6½	51/3	Do. B 3½ p.c.	129—134	69—72	...
108,075	,,	,,	—	46/4½	Do. C.	..	68—71	...
140,865	,,	,,	—	46/4½	New Ordinary	..	63—66	...
352,000	,,	,,	6½	45/-	Wimbledon 5 p.c.	117—122	67—70	...
98,000	,,	,,	6½	50/-	Epsom 5 p.c.	121—126	67—70	...
88,416	,,	Dec. 30	3	3%	3 p.c Deb. Stk.	66—69	50—53	...

* Ex Div.

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